A NUTRITION EDUCATION INTERVENTION AT LIFESTREAM SERVICES, INC. CENTERS ON THE KNOWLEDGE, ATTITUDES, AND INTENT TO CHANGE SENIOR CITIZENS' BEHAVIOR

A THESIS

SUBMITTED TO THE GRADUTE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR

THE DEGREE

MASTER OF SCIENCE

BY

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BALL STATE UNIVERSITY

MUNCIE, IN

DECEMBER 2017

ABSTRACT

THESIS: A Nutrition Education Intervention at LifeStream Services, Inc. Centers on the Knowledge, Attitudes, and Intent to Change Senior Citizens' Behavior

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DEGREE: Master of Science

COLLEGE: College of Health

DATE: December 2017

PAGES: 115

Elderly individuals are at a high risk for developing various chronic diseases due to age and lifestyle factors. In order to combat these factors, federal assistance programs have been implemented to serve senior communities in ensuring they receive adequate nutrition. While great strides have been made to ensure quality nutrition programs for elderly individuals, chronic diseases continue to be prevalent. Thus, more research on nutrition education programs directed at dietary behavior changes for the prevention and management of chronic diseases is needed. This study evaluated the impact of a nutrition education intervention program on the knowledge, attitudes, and intent to change behavior in elderly individuals who were estimated to be at risk or who were already diagnosed with a chronic disease such as diabetes, cardiovascular disease, and obesity. A significant increase in nutrition knowledge for the intervention group was observed, but not in comparison between the baseline and post-test group. While there was no significance observed for attitudes or intent to change behaviors as a result of the education intervention, changes were observed as it related to specific dietary behaviors of participants moving into the action stage.

ACKNOWLEDGEMENTS

First, I would like to express complete gratitude for the support and guidance of my thesis advisor, Dr. Deanna Pucciarelli. I am forever grateful for you believing in me and seeing my full potential. Thank you for your time and dedication that you put into this project.

I would also like to thank my committee members, Dr. Teresia Mbogori and Dr. Jerome Kotecki for their guidance and support. I am grateful for your continuing feedback and helping me develop my research skills. Thank you to my research assistants Monica, Sarah, McKenzie, Megan, and Kylie for taking time from your busy schedules to assist me with weekly onsite visits. It would have truly been difficult to complete this without each of you.

As well, I would like to thank Dr. Carol Friesen for the continued support and contribution provided throughout the start of my project. I appreciate your assistance with providing me with materials to complete my project, and for the partnership with LifeStreams. I would also like to thank Julie Hale and Dana Pierce for allowing me to come into LifeStream centers and work with the members. This study would not have been possible without your guidance and welcoming relationship. Also, thank you to all the members of LifeStreams who were willing to partake in this study. It truly would not have been possible without each of you. Thank you to Dr. Jagdish Khubchandani for your assistance with the analysis of my data.

Lastly, thank you for the continued support from my mom, dad, and fiancé for always believing in me and constantly pushing me to do great things. Without your love, patience, and guidance I could not have made it through this process.

I am truly grateful for each of the contributions of the aforementioned. This study would not have been made possible without the assistance of each and every one of you. I am forever thankful for the endless support from you all.

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CHAPTER 1

INTRODUCTION

Due to the advancement in medical technology, Americans are able to live longer than in previous years (Amarya, Singh, & Sabharwal, 2015). However, the lifestyles of many Americans, including the way they live, eat, and work, contributes to an increased prevalence of chronic diseases, including heart disease, diabetes, and cancer (Ford, Li, Zhao, Pearson, Tsai, & Greenlund, 2010). An estimated 78% of individuals aged 65 and older in the United States have been diagnosed with at least one chronic disease (National Center for Health Statistics, 2015). To combat these lasting diseases, the United States has taken great strides to improve the health of older Americans by reestablishing the Older Americans Act (Thomas, 2014). The purpose of this act is to provide funds to programs that focus on senior health as it relates to senior centers, meals, health support, and more. Despite these federal efforts to decrease chronic diseases, individuals who are at least 65 years of age continue to live with at least one chronic disease (National Center for Health Statistics, 2015).

Proper nutrition among older individuals can assist in maintaining their health and prevent or delay the onset of chronic disease. However, malnutrition is on the rise in this population (Volkert, 2012). Malnutrition is associated with the decline in functionality, impaired muscle function, immune dysfunction, anemia, and even mortality (Amarya et al., 2015). Increasing the intake of nutritious foods within the diet, such as fruits and vegetables, has proven

to be beneficial in reducing the risks of developing hypertension, stroke, and coronary heart disease (Boeing et al., 2012). One way to improve healthy eating within the older population is through nutrition education interventions. Studies have revealed that providing community programs can enhance the knowledge and attitude about nutrition and may lead to individuals selecting more nutritious foods that enhance their overall wellbeing (Wang, Song, Ba, Zhu, & Wen, 2014; Chung & Chung, 2014).

Many disease states are capable of being managed and sometimes even prevented by appropriate dietary and lifestyle interventions along with policies that focus on addressing the underlying causes of poor dietary habits (Slawson, Fitzgerald & Morgan, 2013). Programs that offer educational content associated with skilled learning activities have demonstrated positive effects of change in dietary patterns as it relates to older individuals (Wallace, Lo, & Devine, 2016). These programs that focus on increasing nutrition knowledge and building positive attitudes toward nutrition have the ability to change dietary behaviors of those at nutritional risk (Wang et al, 2014). Cost-effective community nutrition intervention programs for older adults have had positive effects on increasing nutrition knowledge while having the capability of instilling behavior modifications of those with chronic disease conditions (Lyons, 2014).

Knowledge plays a significant role in all areas of processing new information (Miller & Cassady, 2012). However, a common belief remains that poor nutrition behaviors are specifically related to deficits in nutrition knowledge (Lyons, 2014). Intervention programs aimed to increase the nutrition knowledge of older individuals have shown positive results in those who participated (Wang et al, 2014). It is hypothesized, this positive effect in nutrition knowledge may have greater beneficial effects on individual's attitudes, resulting in a greater likelihood that the participants will adopt healthier dietary behaviors. One such program, developed by

Pennsylvania State University Cooperative Extension (PSUCE), has demonstrated the ability to increase knowledge, and impact attitude and behavior modifications in its participants (Pennsylvania State Cooperative Extension, 2016). This *Seniors Eating Well* curriculum offers a variety of techniques, including lectures, activities, and demonstration of certain skills that have successfully incorporated a behavior change, which lead to older adults selecting healthier foods.

While many nutrition programs have focused on the health and wellbeing of the older population, determinants of behavior change are still being studied. More research is needed to identify nutrition education programs that are effective in promoting positive dietary behavior change in the older population in an effort to improve the health and wellbeing of those older individuals who may be at risk for developing chronic diseases.

Problem

An estimated 78% of the population of those who are 65 years or older in the United States have been diagnosed with at least one type of chronic disease (National Center for Health Statistics, 2015). Promotions of healthy lifestyle behaviors are important in managing those with chronic disease (Slawson, Fitgerald, & Morgan, 2013). Intervention methods that focus on personalization, hands-on activities, cues, and use of appropriate theory based models have the opportunity to promote positive effects for nutrition education in older individuals (Sahyoun et al., 2004). Multiple studies have indicated that intervention education programs for the older population provides positive knowledge change outcomes in their participants (Lyons, 2013; Wallace, Lo, & Devine, 2016). Effective nutrition education programs that successfully reach all older individuals are still needed in the community (Volkert, 2012). Having quality community-linked programs that use education to engage older community members in taking part in their

own health management is important in the prevention and control of chronic diseases (Wang et al., 2014). Therefore, there is a need for quality community based programs that focus specifically on the needs of older individuals who are at risk, or attempting to manage their chronic diseases.

Purpose

The purpose of this quantitative study was to evaluate the impact of a nutrition education intervention program on the knowledge, attitudes, and intent to change behavior for those who were ≥ 60 years and were currently managing, or at risk for developing chronic diseases.

Research Questions

The following research questions were examined in this study:

RQ#1: Will the nutrition intervention improve the nutrition knowledge of participants?

RQ#2: Will there be a positive change in participants' attitudes toward dietary changes?

RQ#3: Will the nutrition intervention be associated with the participant's intent to change eating behaviors?

Rationale

Implementation of a nutrition education program has the potential to increase the knowledge of those who are ≥ 60 years; and therefore, may provide them with the ability to make healthy lifestyle changes that could help slow the progression of disease conditions. By providing a curriculum that focuses specifically on the nutritional needs of the older population, an increase in nutrition knowledge and a behavior change among these individuals may occur. Participants within community senior centers engaged in activities and taste tests that were

developed to increase their knowledge and foster a positive attitude towards healthy eating. Having a positive outlook on the health benefits of making nutritious selections can initiate motivation to make behavior changes. Implementation of this nutrition intervention provided participants with the tools to live healthier more independent lives.

Assumptions

The researcher has made the following assumptions as it relates to this study:

1. Participants answered survey questionnaires truthfully as they related to knowledge, attitudes, and behavior.
2. The subjects in this study were representative of the population of elderly 60 years or older individuals who have or are at risk for developing chronic diseases.
3. All data collection carried out by the research team was done according to protocol to maintain consistency in delivery.

Definitions

For the purpose of this study, the following definitions were used:

1. Older population: Those who are ≥ 60 years of age.
2. Nutrition education: Combination of educational strategies designed to facilitate voluntary adoption of food choices and other nutrition-related behaviors that are conducive to health and well-being.
3. Chronic disease: Any condition that affects the health of individuals over an extended period of time of up to or more than three months.

Summary

Chronic diseases have played a major role in determining the overall wellbeing of older individuals in the United States. Lifestyle habits play a direct role in the prevention or management of diseases such as hypertension, diabetes, heart disease, cancer, and stroke. One of the key components in managing these diseases is incorporating proper nutrition into daily dietary plans. While federal programs have made great strides to increase the overall health of the older population, the limited nutrition education programs currently in place do not reach many senior citizens, especially those living in rural or semi-rural areas. Implementing a program that specifically targets the needs and motivations of older individuals can have profound effects on the dietary behavior of the older population. A program that fosters growth in nutrition knowledge and focuses on skill building can have a positive effect on those who are managing or working to prevent chronic disease. Introduction of a nutrition education program for older individuals in the community may improve their dietary health and/or prevent the onset of future diseases. Therefore, this nutrition intervention provided older individuals the tools needed to promote dietary behavior changes.

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CHAPTER 2

REVIEW OF LITERATURE

The purpose of this quantitative study was to evaluate the impact of a nutrition education intervention program on the knowledge, attitudes, and intent to change behavior for those who were ≥ 60 years and were currently managing, or at risk for developing, chronic diseases.

This chapter will present a review of the literature that describes prevalence of chronic diseases within the elderly population, effects on older adult learning, and theory-based education models for behavior change. An overview of senior programs, and the effectiveness of previous nutrition interventions that have been implemented within the aging population are also included.

Introduction

By 2030, the number of individuals 65 years of age or older is estimated to be 74 million (Colby & Ortman, 2015). As the proportion of elderly individuals in the United States increases, the health care system will be strained and medical costs will continue to rise (Ward & Schiller, 2013). Lifestyle behaviors can be correlated to chronic conditions such as high blood pressure, diabetes, and heart disease (Ford, Li, Zhao, Pearson, Tsai, & Greenlund, 2010). Preventative measures, such as promoting healthy lifestyle behaviors for the aging population within the community, can improve quality of live for older Americans as well as help ease the burden of

chronic disease costs to the public health systems (Centers for Disease Control, 2011). Continued deficits in nutrition knowledge, such as understanding portion sizes, indicates that there is still an on-going need for nutrition education programs within communities (Dijkstra, Neter, Brouwer, Huisman, & Visser, 2014; Marakis, Tsigarida, Mila, & Panagiotakos, 2014).

Currently, there are various programs that help ensure seniors within the community receive the nutrition support they need (Thomas, 2014; United States Department of Health and Human Services, 2016). The United States Administration on Aging (USAA) offers nutrition programs for the elderly. Within these programs, grants are awarded to community programs that provide nutrition education curricula with the goal to improve nutritional outcomes of older adults. These community programs are offered through senior centers, churches, schools, or homebound support (Department of Health and Human Services & Administration on Community Living, 2016). While educational programs like these have impacted nutrient intake and knowledge among the elderly, prevention and education programs have not succeeded in ensuring that all older adults have access to these types of programs or continuous access to healthful foods (Volkert, 2013; Oemichen & Smith, 2016; Brownie & Coutts, 2013).

Chronic Diseases

According to Warshaw (2006) a chronic disease is a condition that lasts a year or more and requires ongoing medical attention and/or limits activities of daily living. As of 2012, about half of all adults in the United States—117 million people—had one or more chronic health conditions (Ward, Schiller, & Goodman, 2014). Chronic diseases are responsible for 7 of 10 deaths each year (Heron, 2016). Treating people with chronic diseases accounts for 86% of our

nation's health care costs. Five of the most prevalent chronic diseases include heart disease, type 2 diabetes, cancer, stroke, and obesity (Kochanek, Murphy, Xu, & Tejada-Vera, 2016).

The development of a chronic disease has been linked to a decrease in independence and overall health of elderly adults (Amarya et al., 2015). Lifestyle behaviors such as choices regarding nutrition and physical behaviors affect health outcomes of the aging (Péter et al., 2015). A goal of *Healthy People 2020,* which provides science-based objectives for improving Americans' health, is to improve the function and quality of life for the elderly (US Department of Health and Human Services, 2016; Bernstein & Munoz, 2012). Community based programs that target those with chronic diseases, such as diabetes, have shown to help increase the quality of life for these individuals (Lorig, Ritter, Pifer, & Werner, 2014).

Prevalence within the Aging Population

In the US, 80% of individuals who are 65 years or older have been diagnosed with at least one chronic disease, and 50% have at least two or more chronic diseases (Centers for Disease Control, 2011). According to a National Diabetes statistic report, an estimated 11.2 million Americans who were 65 years or older in 2011 were either diagnosed, or yet to be diagnosed, with diabetes (Center for Disease Control and Prevention, 2011). Diabetes is linked to the development of other chronic diseases, including heart disease and stroke. Uncontrolled diabetes can increase the risk of atherosclerotic development which is associated with cardiovascular disease (Caspersen, Thomas, Boseman, Beckles, & Albright, 2012).

Cardiovascular disease accounts for 30.3% of public health complications among all chronic diseases of those 60 years or older (Prince et al., 2015). Health effects of cardiovascular disease have been linked to dementia, frailty, loss of independence and institutionalization (Yazdanyar & Newman, 2009). Loss of independence in these individuals can lead to the need

for long-term care centers, which impacts and increases health care costs in the nation (Abdelhafiz & Sinclair, 2013). Programs that focus on healthy aging can assist in the prevention or management of chronic diseases among the elderly population, and can lead them to live healthy, independent lives (Bauer, Briss, Goodman, & Bowman, 2014).

Health Implications of Chronic Disease

Nutrition as it relates to health accounts for the physiological, sociological, and psychological well-being for a greater quality of life (Bernstein & Munoz, 2012). Diseases such as cardiovascular disease, diabetes, and cancer account for nearly two-thirds of deaths globally, along with accounting for a large portion of the morbidity and disability costs accrued in the United States (Bauer et al., 2014). Cardiovascular disease, as it relates to atherosclerosis, has been linked to decline in cognitive function (Weinstein, Lutski, Goldbourt, & Tanne, 2017). Other chronic diseases, such as diabetes, can sustain various burdens on the individuals themselves by causing a decline in physical and cognitive function (Samaras et al., 2014).

Chronic diseases inhibit the quality of life among elderly adults who are unable to perform basic daily functions such as bathing oneself, taking proper medications, preparing meals, and shopping (Gill et al., 2013). Lack of physical mobility can alter significantly the care and support these individuals need, and hence, increase the need of long-term care facilities in the future for the growing older population (Yazdanyar & Newman, 2009). In medical management of chronic disease, medications can have effects on taste sensation leading to a lack of appetite among the elderly (Pilgrim, Robinson, Sayer, & Roberts, 2015). This factor, along with altering nutrient needs to meet the requirements of each specific chronic disease, can ultimately lead to malnutrition within the elderly population (Volkert, 2013).

Nutrition Recommendations

Proper nutrition consumption among elderly individuals can reduce their risk of developing chronic diseases such as high blood pressure and heart disease (Slawson, Fitzgerald, & Morgan, 2013). Aging is associated with a reduced lean body mass and basal metabolic rate; consequently, specific reduction or inclusion of various nutrients along with overall energy intake must be carefully reviewed (Westersterp & Meijers, 2001; Roberts & Rosenberg, 2006). Recent data indicates that those 65 years and older are consuming more whole fruits and grains compared to those younger, but they also have the greatest consumption of refined grains and empty calories (United States Department of Agriculture, 2016). Based on the United States Department of Agriculture 2015-2020 Dietary Guidelines, those who are 50 years of age or older should consume daily 1 ½- 2 ½ cups of fruit, 2- 3 ½ cups of vegetables, 5-10 oz of grains with at least half coming from whole grains, 5-7 oz of lean protein foods, and 3 cups of fat free or low-fat dairy products (United States Department of Health and Human Services & United States Department of Agriculture, 2015). Added sugars should be limited to less than 10% per day of total carbohydrate intake and sodium consumption for a healthy adult should be less than 2300 mg per day. Non-compliance of these recommendations may have negative health effects, such as increased triglycerides and inflammatory response from increased sugar consumption (Raatz, Johnson, & Picklo, 2015).

There are several health benefits for older adults to follow these nutrition guidelines. Consumption of a variety of fruits and vegetables may help lower the risk of developing cardiac disease (Boeing et al., 2012). Fiber consumption from whole grains, fruits, and vegetables can help keep the gastrointestinal tract normal along with manage cholesterol and glucose levels

(Slavin, 2013). Following these recommendations of healthy eating may help lower the risk of developing chronic diseases.

Adult Learning

Since 1960, health education has been a primary focus in the prevention and management of chronic diseases in developed countries (Nutbeam, 2000). More recently the focus has been on health literacy, which is defined as the ability to obtain, process, and understand health information to promote healthy lifestyles (US Department of Health and Human Services, 2008). However, only about 5% of United States adults who are 65-75 years are proficient in health literacy (United States Department of Education, 2006). Being able to understand and use health information for the management of chronic diseases is imperative for positive health in older adults (Speros, 2009). Low health literacy and cognitive abilities can independently predict mortality risk for older adults, and therefore, future health education for this population should focus on the cognitive functions for the self-management of chronic disease (Baker, Wolf, Feinglass, & Thompson, 2008). These variables and other potential factors make recruiting for this population challenging (MacFarlane et al., 2015). Hence, it is important that future health educators understand and gear health education towards the cognitive needs and motivation of older adults.

Cognitive Function in Older Adults

Many physiological changes occur throughout aging, which can impact the individual's ability to learn. Aging effects the integrity of brain function through loss of the blood brain barrier and overall neurological function (Yang, Sun, Lu, Leak, & Zahng, 2017). Due to cognitive function decline, older adults may require more time to learn a certain subject and

require more variability than a video or lecture (Beier and Ackerman, 2005). Older adults also require a longer period of learning time as opposed to a quick one-day lesson. Other factors that play a role in cognitive function are education level, overall health, and mortality (Smith and Balthes, 1997). Researchers found that increased chronic inflammation, such as that related to atherosclerosis, was correlated to cognitive decline in elderly individuals (Weinstein, Lutski, Goldbourt, & Tanne, 2017).

Cognitive decline can be associated with other factors beyond physical changes. Hearing loss has been associated with accelerated cognitive impairment among older-adults (Lin et al, 2013). This can affect testing performance based on poor verbal communication that accompanies hearing loss. Vision deficit may also impact the ability for those of the older population to learn. One study found that older individuals who participated in a low-vision rehabilitation program had improvement in their cognitive functions when their vision improved (Whitson et al, 2013). To ensure messages are clearly delivered during education sessions, health educators should focus on teaching strategies that are tailored to the psychological and physiological changes of aging adults (Speros, 2009).

Learning Strategies for Educators

Successfulness of health education for older adults lies within the ability to relate to their learning needs (Speros, 2009). Learning needs are based on the foundation of how and why older adults learn. One determinant of why older adults learn is based on the value and meaningfulness of the material given. Those who are older will be more apt and willing to learn new information if they perceive it to be relevant to their life (Cooper, Booth, and Gill, 2003). Education materials should be relevant to the population that is being educated to increase the likelihood that individuals may perceive the information as important, and therefore, are more likely to

participate. Motivation is also an important aspect for determining the ability to learn, Studies have indicated that greater engagement in learning was reflected by the participants' interest in the subject, and if they found the information to be important (Rothes, Lemos, and Goncalves, 2017; Whitehead, 2016). This is also known as autonomous motivation.

Beyond value, meaningfulness and motivation is also needed and the health educator should design materials and teaching strategies that include how older adults learn. Health programs that accommodate aging learners need to focus on clear communication that is purposeful and individualized for each individual (Speros, 2009). Education content should also focus on skilled learning activities, such as hands-on projects (Wallace, Lo, & Devine, 2016). Intervention methods that focus on personalization, hands-on activities, cues, and use of appropriate theory based models have shown positive effects on education processing for older individuals (Sahyoun et al., 2004).

Nutrition Education

Within the health care system, various education models are implemented to get individuals to modify their dietary behaviors to adopt a healthier lifestyle (Lyons, 2014). Developing practical, clinical, and nutritional interventions could help improve the quality of life for the aging population, along with easing the burden of health care costs (Verburgh, 2015). Prevention education for the aging population needs to emphasize person-centered, home-bound outreach, and multidimensional assessments (Prince et al., 2015). There are multiple resources for those who are 60 years or older to help reduce or manage their risks of chronic diseases; these include the National Council on Aging (2016), the Administration on Aging, and local state and county departments that offer support in the community (United States Department of

Agriculture & Food and Nutrition Services, 2016). These programs that focus on increasing nutrition knowledge and providing nutritious foods to participants have shown the ability to lower the prevalence of those at nutritional risk (Kim, Kim, & Lee, 2012). While many of these programs focus on knowledge change, dietary behavior modification is an important aspect of nutrition programs (Lyons, 2014). Behavior modifications can be quite challenging, but programs that focus on positive images on aging, self-confidence, and self-motivation may have the ability for older adults to make dietary behavior changes (Bardach, Schoenberg, & Howell, 2016).

Existing Behavior Change Models

The Transtheoretical Model (TTM) is a behavior theory model that is commonly used in research. This model describes behavior change based on five stages ranging from pre-contemplation to maintenance (Spencer, Wharton, Moyle, & Adams, 2007). This theory is employed abundantly in research studies to determine its effectiveness on dietary behavior modifications (Horwath, Schembre, Motl, Dishman, & Nigg, 2013). Studies have indicated that the use of this model in dietary behavior modifications, such as an increase in fruits and vegetables, has shown positive results in promoting healthy dietary selections (Horwath et al., 2013; Mao et al., 2010). While positive outcomes have resulted from the use of TTM, behavior modification is complex, and therefore, uses of this model is not entirely conclusive (Spencer et al., 2007).

The Health Belief Model has also been extensively studied as a source of increasing knowledge and behavior change among all ages (Janz & Becker, 1984). The theory of this model is that individuals perceive a threat, understand there are certain outcomes to behavioral choices, and the individual assesses their ability to successfully execute the behavior to obtain the desired

outcome (Baghianimoghadam et al., 2013). Creating programs that lead to behavior change through increased knowledge have shown to be beneficial for individuals (Ghisi, Abdallah, Grace, Thomas, & Oh, 2014). Practices that lead to a behavior change through increased knowledge and attitude may be effective in improving nutrition outcomes for those with chronic diseases (Wang, Song, Ba, Zhu, & Wen, 2014).

The Social Cognitive Theory is another prevalent behavior change theory that is used research designs. The basis of this model is that behavior is affected by the individual's personal factors such as cognition and the environment (Bandura, 2004). Those changes in one factor have implications for the other factors. This type of behavior change theory has shown the potential to lower the risks of those who are likely to develop cardiovascular disease (Ahn, Kwon, Kim, Yoon, & Kim, 2015). A combination of these various theories may also enhance behavior outcomes for older adults (Lyons, 2014).

Nutrition Programs for Adults

Various nutrition education programs are made public through online or local resources in the community. In 2008, the United States Department of Agriculture (USDA) established a program called "Eat Smart, Live Strong" (United States Department of Health and Human Services, 2013). This program targets 60-74 year old individuals to improve fruit and vegetable consumption while increasing physical activity. Session goals are to provide skills to elderly individuals that are needed to improve their nutrient consumption and exercise frequency.

The US Department of Health and Human Services (DHHS) provides a wide variety of programs that support the nutritional needs of those individuals that are 60 years or older. Under the Older Americans Act, federally funded programs focus on reducing hunger and food insecurity while promoting health and well-being of older individuals (DHHS, 2016). The

overall goal of this program is to provide nutritious meals that may help delay adverse health conditions which are associated with malnutrition. Other programs that offer nutritious foods to seniors are the Supplemental Nutrition Assistance Program (SNAP), Senior Farmers' Market Nutrition Program (SFMNP), Commodity Supplemental Food Program (CSFP), and The Emergency Food Assistance Program (TEFAP) (United States Department of Agriculture and Food and Nutrition Services, 2016). Individuals participating in these types of programs showed a decrease in anxiety, less hospital admissions, and a decrease in frailty (Thomas & Dosa, 2015). However, not all seniors take advantage of these programs due to lack of knowledge about the program or the stigma associated with receiving assistance (Oemichen & Smith, 2016). For those who do participate in these meal assistant programs, there is still mixed reviews on their ability to change dietary habits as it relates to those with chronic disease (Noda et al., 2012; Racine, Lyerly, Troyer, Warren-Findlow, & McAuley, 2012).

One such program that focuses on nutrition education with the outcome of behavior modifications for older members is the "Seniors Eating Well" curriculum developed by Pennsylvania State University Cooperative Extension (PSUCE, 2016). The overall objective of this program is to elicit behavior change in those 60 years or older to make healthier food selections and lifestyle habits (PSUCE, 2016). The focus of this program is to ensure that elderly individuals understand the current USDA dietary guidelines in order to live a healthier, more independent life. This education curriculum was designed and tested to meet the needs and interests of those who are elderly. Use of these types of programs within the community may help prevent, or manage chronic disease onset of those elderly individuals who require nutrition assistance (PSUCE, 2016).

Effectiveness of Nutrition Interventions

Nutrition and health choices that individuals make are based on behaviors that are developed throughout a lifetime; and therefore, making dietary modifications can be difficult (Bardach et al., 2016). However, it is these positive lifestyle behaviors that can affect the quality of life as we age. Behavior modifications may be hindered by a lack of nutrition knowledge (Lyons, 2014). Researchers have indicated a need for quality nutrition programs that focus on chronic disease prevention, such as decreased sodium intake, to improve nutrition knowledge of older adults (Marakis, Tsigarida, Mila, & Panagiotakos, 2014). Development of programs that focus on knowledge and personal motivation are important factors in determining behavior change (Miller & Cassady, 2012). Nutrition education studies have shown that by increasing nutrition knowledge and the attitude of elderly individuals, behavior changes as it relates to healthy eating may occur (Ahn et al., 2015; Wallace et al., 2016; Brewer, Dickens, Humphrey, and Stephenson, 2016). While increase in knowledge and change in positive attitudes may lead to changes in dietary behaviors, there are still other contributing factors, such as resources or finances, that prohibit older adults from making healthful food selections (Brownie & Coutts, 2013).

Implication on Knowledge and Attitude

Wallace, Lo, & Devine (2016) conducted a 4-week nutrition education intervention that was designed to meet the needs of elderly dementia patients. The researchers wanted to assess the programs ability to sustain long-term behavior and knowledge change within 72 elderly men and women > 61 years old that lived independently. The researchers used the Social Cognitive Theory, and a group approach that incorporated cooking and nutritional education components over a 4-week period. The lessons were designed over four, three-hour sessions that discussed

nutritional components to decrease the risk of declining neurocognitive health. Any significant changes in knowledge or attitude were identified using effect size (ES), and were listed as either small (S), medium (M), or large (L). Baseline attitudes about eating healthy and cooking were measured on a Likert scale of 1-5. Ninety percent of the participants at baseline indicated that eating healthy and cooking were very important. This attitude remained unchanged at the end of the intervention. While attitude was high regarding healthy eating, the researchers found that the baseline knowledge of the participants was low.

At evaluation, knowledge scores were found to increase from 19 to 27.2 (ES= 0.972 (L)). Significant difference in knowledge from baseline to post-intervention was seen ($p<0.001$, ES 0.972). The knowledge change corresponded to a 43% increase, and was maintained for >3 months. The researchers concluded that, although individuals had increased their variety of vegetables ($p =0.007$, ES= 0.35) after the intervention, their overall servings of fruits ($p = 0.843$) and vegetables combined ($p= 0.409$) did not increase. Participants were able to retain their healthy eating knowledge and were able to recognize barriers that inhibited them from making healthy choices.

Implication on Intent to Change Behavior

A study completed by Walker, Murimi Kim, Hunt, Erickson, and Strimbu (2012), looked at the effects of a point-of-testing, nutrition education intervention for Louisiana rural community members, who were 65 years or older. In this intervention, participants first attended a community health screening to obtain information regarding their BMI, blood pressure, fasting blood glucose, total and LDL cholesterol, and dietary intake. Once results were completed, each participant received immediately one-on-one counseling, were informed of community based sites that offered physical activity classes, and could attend group nutrition and disease

management education from a registered dietitian, or an individual that was trained by the registered dietitian. Each individual had the opportunity to return for a counseling session once every six months for three years. Nutrition education materials were based on the guidelines of the United States Department of Agriculture MyPlate curriculum, and the American Heart Association, and American Diabetes Association. The mean age of participants was 73.5± 6.4. A total of 111 participants completed at least three sessions. In this group of participants, researchers found a significant change in BMI (27.8 to 24.8; $p \leq 0.01$) and serum LDL cholesterol (114.5 to 103.0; $p \leq 0.03$). For individuals who attended at least four sessions, there was a significant change in fasting blood glucose (102.1 to 93.7; $p \leq 0.03$) and diastolic blood pressure (79.1 to 69.7; $p \leq 0.05$). This study concluded that the use of community based nutrition interventions combined with point-of-testing nutrition counseling has the potential to prevent and manage chronic diseases in older adults.

Summary

Malnutrition as it relates to chronic disease status within the elderly population is a growing concern. Those 65 years or older will make up a larger portion of the United States population as the baby boomer generation continues to age. This creates a growing concern for the load on our public health systems. Aging is associated with an increase in medical needs due to diseases such as heart disease, diabetes, cancer, arthritis, and obesity. Prevention programs as it relates to increased nutrition and physical health for this population is the key to decreasing overall health burdens of this population. While there are already many senior support programs that focus on overall health, there is an increased need to promote nutrition education components that specifically look at increasing knowledge, attitudes, and behavior changes of

those who have or are at risk for developing chronic diseases. Health prevention programs are most successful when they meet the learning needs of older adults. This includes tailoring education programs that focus on the neurological and physiological changes of aging, and on the motivation and interest of older adults. Implementing these programs into community based centers that are easily accessible for the elderly is important to making a change. By changing the behaviors of those elderly individuals who are at risk or have developed chronic diseases, it can influence their overall quality of life, and help decrease the United States public health fiscal burden.

CHAPTER 3

METHODOLOGY

The purpose of this quantitative study was to evaluate the impact of a nutrition education intervention program on the knowledge, attitudes, and intent to change behavior for those who were ≥ 60 years and were currently managing, or at risk for developing chronic diseases. This chapter will discuss the methods that were used to conduct this study.

Institutional Review Board

Permission to carry out the study was requested from the Ball State University Institutional Review Board (IRB). The study was approved by Ball State University IRB on January 6, 2017 as exempt (Appendix A-1). The researcher and research assistants completed the Collaborative Institutional Training Initiative, and were deemed certified (Appendix A-2).

Letter of Support

Both the Wellness Director and Café Coordinator from LifeStream Services, Inc. were supportive of the study along with its procedures. A letter of support was obtained from the LifeStream Services, Inc. president (Appendix B).

Subjects

Subjects for this study were selected based on a convenience sample of male and female individuals who were 60 years of age and older, and were participants at LifeStream Services Inc. Community Centers in Muncie, Daleville, and Anderson, Indiana. Participant selection was determined by the number of individuals who participated in the centers' lunch programs and were willing to participate in the study. Intervention sites were chosen based on LifeStream Services Inc.'s interest in collaborating with the principal investigator (PI).

Instruments

Education

Seniors Eating Well is a curriculum consisting of nine health topics, and was developed by the Pennsylvania State University Cooperative Extension (PSUCE) office. Six of the nine lessons from the curriculum were chosen because these six lessons included materials that aligned with the nutrition and prevention of chronic diseases. The lessons selected included: *1*) *Great Grain Discoveries, 2) All Star Senior Snacks, 3) Heart Healthy Meals, 4) Evaluating Dietary Supplements for Seniors, 5) Cooking and Seasoning with Herbs,* and *6) Dietary Fat-Fact or Fiction*. The lesson plans have indicated positive results in increasing the knowledge, attitude, and behavior change based on 3-6 month follow ups (PSUCE, 2016).

Survey Instrument

Pre- and post-test surveys were designed by the PI, and modified from the PSUCE materials (Appendix C-1). The survey was developed to measure participants' knowledge, attitudes, and intent to change behavior. The multiple-choice knowledge portion of the survey was developed by the PI and comes from the information that was provided in the nutrition education lessons. The attitude portion of the survey was also developed by the PI, and questions

were structured in three subgroups that measured the participants' beliefs of eating healthier, perspectives on how different food-groups affect their overall health, and their interest in learning about nutrition.

The intent to change behavior portion of the survey was based on the Stages of Change Model using an instrument that was developed by Dr. Carol Friesen for the Working Well Lab at Ball State University (2010). Parts of this instrument were reformatted by the PI to include measurements of behaviors that were relevant to this study. The five stages include: pre-contemplation, contemplation, preparation, action, and maintenance. Participants were asked six dietary consumption questions related to dietary patterns of low sodium foods, low sugar foods, servings of fruits and vegetables, nonfat dairy products, and whole grain bread and cereal products. The surveys were administered at baseline and again at week six-week post-intervention. Face validity of surveys were tested using the expertise of nutrition and health science faculty at Ball State University in the Nutrition and Health Science Department.

Post-lesson evaluations were also administered daily, and measured knowledge, attitudes, and intent to change behavior (Appendix C-2). These evaluations were developed to co-align with the daily education curriculum. These daily evaluations were developed and validated by PSUCE.

In order to remain anonymous, subjects were coded with an identification (ID) that included their first, middle, and last initials along with their full birth year. All surveys were kept in a locked office.

Intervention

Background

In September of 2016, the PI reached out to the Wellness Director of LifeStream Services Inc. to discuss possible interest of participation in this study. A meeting with the Wellness Director and Café Coordinator took place, and the PI explained the procedures and benefits that this study had to offer to their clients. Permission to carry-out this study was obtained (Appendix B) and site selection was suggested by the Café Coordinator based on low exposure to nutrition education in specific centers.

In October of 2016, the PI visited the Muncie Forest Park Senior Center to observe the environment and daily routine of the center and its members. The Café Coordinator confirmed that the other two selected sites were organized the same, and had the same members return weekly for their lunches.

Seniors Eating Well Curriculum was identified as the education tool as it specifically is designed to meet the nutritional needs and learning styles of older individuals. The Pennsylvania State University Cooperative Extension (PSUCE) office offers lesson plans that are designed to meet the interests and needs of senior members, and follows the current United States Department of Agriculture (USDA) 2015-2020 Nutrition Guidelines for Americans. These lessons were obtained in the fall of 2016.

Compensation

Participants had the opportunity to participate in a raffle to win $20 cash for compensation of their time. Those who attended the weekly lessons obtained a raffle ticket from the PI before the start of each lesson, and participants then dropped their raffle in a site bucket. Each week, the weekly raffle tickets were added to each site's bucket. At the conclusion of the study, the PI drew three separate raffle tickets at each site to determine the winners. Each

participant was only able to win once. The winners' tickets were collected and the ticket number, site location, and amount given was collected and entered onto a compensation form.

Intervention

In February 2017, the PI visited each of the LifeStream Services, Inc. centers to provide information about the study, and invited participants to join (Appendix D). All the senior members who attended the Muncie and Anderson LifeStream Services Inc. center's lunch program were invited to join the study regardless of age, but data was not collected from those members who were not 60 years or older. Those who were interested in participating in the study completed a subject consent form (Appendix E).

After consent approval, participants filled out the pre-test survey, which evaluated their baseline nutrition knowledge, attitudes, and behaviors regarding overall nutrition concepts. Participants were instructed to include their first, middle, last initials and full birth year on the survey to ensure data collected remained anonymous. These surveys were collected by the PI, and the research assistant prior to the start of the first education session.

Immediately following the pre-test surveys, the PI gave the first lesson plan. The education session began with a lecture lasting about 20 minutes. The PI and the research assistants then had the participants partake in an activity to further engage the members in the education session. After the activity, post-lesson evaluations were handed out for participants to complete.

The PI returned weekly to each of the three sites to deliver a new nutrition lesson. Each weekly session took approximately 45-minutes, and focused on nutritional needs that prevent or aid in managing those with chronic illnesses. Each of the lessons were given during the participants' meal time at the LifeStream Services, Inc. center. The PI and the research assistant

were on site for education lessons at site one on Mondays, at site two on Tuesdays, and site three on Wednesdays.

Weekly, The PI and research assistant helped pass out materials and raffle tickets for that day. Raffle tickets were passed out each week, and were put into a drawing for participants to win $20 at the end of week six. The raffle tickets were provided to entice members to come to each weekly session and to complete the entire study. The raffle drawing for subject participation took place after all surveys were collected.

The PI began each session with the objectives of that lesson. All presentations included power point hand-outs developed by PSUCE along with informational hand-outs and games integrated into the program to further engage the participants. The *Cooking and Seasoning with Herbs* lesson included a taste test component. Post-lesson evaluations were completed weekly after each lesson.

The final week took place in March of 2017. The final 45- minute lesson was given by the PI. Following that day's lesson, participants filled out the final post-lesson evaluation, and then completed the post-test survey to gauge their final knowledge, attitude and intention of behavior change after receiving the six-week nutrition education intervention. Knowledge evaluation was information covered from the entirety of the program.

Data Analysis

Initial data collected from pre-and post-surveys and post-lesson evaluations were entered into Microsoft Excel 2016 version 1707 spreadsheets. The spreadsheet contained the pre-and post-survey responses from each participant for knowledge, attitudes, and intent of behavior change along with each post-lesson evaluation. The data was then uploaded to SPSS 24.0 for Windows for statistical analysis. For pre- and post-survey data, descriptive statistics, including

statistical frequency, and non-parametric t-test were used to analyze changes in knowledge, attitudes, and intent to change behaviors. For the post-lesson evaluations, descriptive statistics and Chi-Square test were ran to determine significant difference. Significant difference was set at $p<0.05$.

Summary

This quantitative study was designed to implement a nutrition education program for participants who attended a LifeStream's Services Inc. senior center in Muncie, Daleville, and Anderson, Indiana in an effort to improve their knowledge, attitudes, and intent to change dietary behaviors for those at risk of developing or who have a chronic disease. Implementing a program that specifically targets the needs and motivations of older individuals can make learning about nutrition more enjoyable and increase their participation in nutrition education. The goal of this study was to provide participants with the knowledge and tools they needed to make more healthful choices that will help manage or prevent the onset of diseases. By including hands-on activities and providing taste samples this further helped the older individuals to understand and grasp the concept of the information that was provided to them. Changes in knowledge, attitudes, and intent to change behavior were evaluated using measurements from both the pre-and post-survey and post-lesson evaluations.

CHAPTER 4

RESULTS

The purpose of this quantitative study was to evaluate the impact of a nutrition education intervention program on the knowledge, attitudes, and intent to change behavior for those who were ≥ 60 years and were currently managing, or at risk for developing chronic diseases. This chapter will discuss the findings of the research for the individual research questions.

Subjects

Participants were invited from three LifeStream Inc., centers in Muncie, Daleville, and Anderson, Indiana (N=62). Study groups were broken into baseline, intervention, and post-test (N=49). A fourth group included participants that completed the daily evaluations of the lessons (N=13). Table 1 displays the three study groups in regard to each of the surveys the participants completed. The intervention group (N=12) were those participants who completed both the pre-test and post-test survey. Baseline were those participants who completed only the pre-test survey (N=22), and post-test were those participants who completed only the post-test survey after the education intervention (N=15).

Table 1. Participant Groups	Survey Completed	
Group	**Pre-Test**	**Post-Test**
Baseline	+[1]	-[2]
Intervention	+	+
Post-test	-	+

+[1] is the group that completed the survey; -[2] is the group that did not complete the survey

Gender distribution and chronic disease presence are illustrated in Figure 1, with one participant in the post-test group not indicating a specific gender. Overall, 49% (n=24) were male and 49% (n=24) were female, and 63% (n=31) had at least one chronic disease. The average age range of participants was 70-79 years.

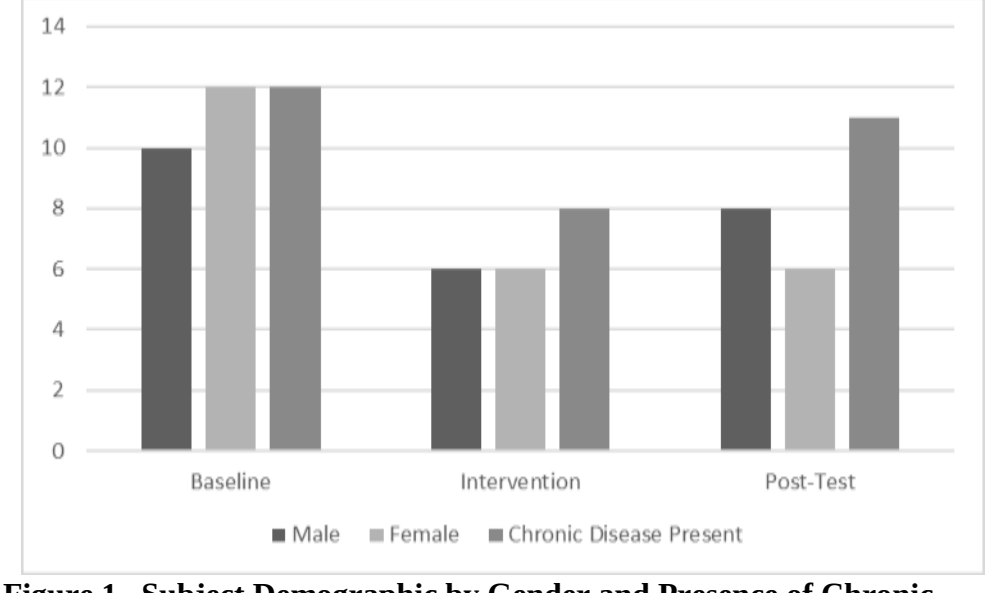

Figure 1. Subject Demographic by Gender and Presence of Chronic Disease (Baseline, Intervention, and Post-test) N=49

RQ#1: Knowledge Assessment

Research question one attempted to measure a change in knowledge after the six-week education sessions. The first portion of the survey tested participants' nutrition knowledge as it related to whole grains, fats, heart healthy foods, supplement safety, and healthy snacks. Results were determined by comparing the intervention groups' pre-and-post-test answers (N=12). Results were also derived from comparisons between the baseline group (N=22) and the post-test group (N=15).

Intervention Group Knowledge

Percent change in knowledge over the entire study were analyzed for the intervention group (N=12). Participants were asked nutritional questions over multiple lessons throughout the education sessions. An increase in percent from the pre-test to the post-test indicated a positive change in knowledge. Results from the intervention group are illustrated in Table 2.

When asked "how many ounces of whole grain should you eat daily?" no participants were able to answer correctly in the pre-test assessment, and 25% (n=3) were able to answer "3 ounces" in the post-test assessment. In the pre-test assessment, no participants could answer the question "which type of fat should you not include in your diet?", and 41.7% (n=5) correctly selected "trans-fat" in the post-test assessment.

Overall, participants showed a 75% increase in correctly answered questions from the pre-test to the post-test surveys. Wilcoxon Signed Rank indicated a significant improvement in nutrition knowledge of participants who completed the entire intervention ($z=-2.56$, $p= 0.010$), with a large effect size ($r= -0.52$).

Table 2. Change in Knowledge (Intervention) N=12

	% Correct	% Correct	
Question	***Pre-Test***	**Post-Test**	**Change**
How many ounces of whole grain should you eat daily?	0.0	25.0	+[1]
Which is the best whole grain option?	41.7	58.3	+
Which two are the best sources of fiber?	41.7	58.3	+
How often should you eat a snack during the day?	8.3	8.3	NC[2]
A good snack includes which selections: fruit	75.0	83.3	+
A good snack includes which selections: vegetables	25.0	50.0	+
Circle which foods are grocery staples for heart healthy: fish-fillets	50.0	58.3	+
Circle which foods are grocery staples for heart healthy: Low-fat-yogurt	33.3	58.3	+
Circle which foods are grocery staples for heart healthy: Avocados	8.3	50.0	+
Which is a lean cut of meat?	83.3	75.0	-[3]
Circle what are lower fat cooking methods: poaching	41.7	41.7	NC
Circle what are lower fat cooking methods: Steaming	58.3	75.0	+
Circle what are lower fat cooking methods: Baking	16.7	50.0	+
Which is recommended supplement for those over the age of 60?	8.3	41.7	+
Who/what should you consult before taking a supplement?	83.3	91.7	+
What is the maximum percent daily value of supplements that you should consume daily?	16.7	8.3	-
Circle which foods are a good source of unsaturated fat: Avocados	16.7	58.3	+
Circle which foods are a good source of unsaturated fat: Fish	66.7	75.0	+
Which type of fat should you not include in your diet?	0.0	41.7	+
Which is not a fat-soluble vitamin?	8.3	8.3	NC
Circle the herbs: Garlic	50.0	58.3	+
Circle the herbs: Thyme	66.7	75.0	+
Circle the herbs: Cilantro	58.3	83.3	+
What is a benefit of lowering your salt intake to recommended levels?	83.3	33.3	-

+[1] is an increase in the question answered correctly; NC[2] is no change; -[3] is a decrease in the question answered correctly

Baseline or Post-test Group Knowledge

Statistical frequencies and two-tailed t-tests were completed for knowledge based questions for those participants in the baseline group (N=22), and with those in the post-test group (N=15) (Table 3). When asked "how many ounces of whole grain should you eat daily?" 20% (n=4) in the baseline and 60% (n=9) in the post-test group answered "3 ounces" (p=0.015). As it related to the question "a good snack includes which selections?" 77% (n=12) in the baseline group and 100% (n=15) in the post-test group could correctly select "fruit" (p=0.047). Using t-test analysis results indicate that overall there was no significant difference in knowledge between the baseline group compared to the post-test group. However, overall there was a 79% increase in correct answers from the baseline group to the post-test group.

There was a significant difference in weight perception between the baseline and post-test group (p=0.011). Of the baseline group, 54.5% (n=12) were diagnosed with a chronic disease, 73% (n=16) stated they were overweight, and 45.5% (n=10) were male. There was no significant difference in gender, age, or diagnosis of chronic disease between the baseline and post-test group.

Table 3. Change in Knowledge (Baseline vs. Post-test) N=37

Question	% Correct Baseline	% Correct Post-Test	Change
How many ounces of whole grain should you eat daily?	20.0	60.0	+*
Which is the best whole grain option?	38.0	53.0	+[1]
Which two are the best sources of fiber?	50.0	53.0	+
How often should you eat a snack during the day?	29.0	47.0	+
A good snack includes which selections: fruit	77.0	100.0	+*
A good snack includes which selections: vegetables	27.0	27.0	NC[2]
Circle which foods are grocery staples for heart healthy: fish-fillets	55.0	67.0	+
Circle which foods are grocery staples for heart healthy: Low-fat-yogurt	55.0	80.0	+
Circle which foods are grocery staples for heart healthy: Avocados	23.0	33.0	+
Which is a lean cut of meat?	91.0	87.0	-[3]
Circle what are lower fat cooking methods: poaching	50.0	62.0	+
Circle what are lower fat cooking methods: Steaming	75.0	77.0	+
Circle what are lower fat cooking methods: Baking	55.0	85.0	+
Which is recommended supplement for those over the age of 60?	33.0	39.0	+
Who/what should you consult before taking a supplement?	95.0	100.0	+
What is the maximum percent daily value of supplements that you should consume daily?	26.0	15.0	-
Circle which foods are a good source of unsaturated fat: Avocados	50.0	53.0	+
Circle which foods are a good source of unsaturated fat: Fish	59.0	87.0	+
Which type of fat should you not include in your diet?	19.0	33.0	+
Which is not a fat-soluble vitamin?	14.0	27.0	+
Circle the herbs: Garlic	40.0	47.0	+
Circle the herbs: Thyme	55.0	67.0	+
Circle the herbs: Cilantro	65.0	53.0	-
What is a benefit of lowering your salt intake to recommended levels?	57.0	47.0	-

**Significant difference $p<0.05$; $+^{1}$ is an increase in the question answered correctly; NC^{2} is no change; $-^{3}$ is a decrease in the question answered correctly*

RQ#2: Attitude Assessment

The second research question measured changes in attitude and if there was a positive attitude associated with nutrition after the education intervention. Participants were asked a series of attitude nutrition related questions, and then selected “strongly disagree”, “disagree”, “agree”, or “strongly agree”. Percentages presented in the following tables were based on those

participants who selected “strongly agreed” or “agreed” and were collapsed into one category for analysis.

Intervention Group Attitude

In the first series of attitude questions, participants were asked to select how nutrition played a role in health. In the pre-test assessment 100% (n=12), either strongly agreed or agreed that nutrition was important for health, while 100% (n=12) in the post-test also agreed that nutrition was important for health (Table 4). The second set of attitude questions assessed participants’ beliefs of specific food groups. In the pre-test (n=11) and post-test (n=12), 100% agreed or strongly agreed that lowering sugar consumption was good for their health. One participant did not give an answer in the pre-test. The last series of attitude questions were based on the participant’s interest in learning about nutrition, and limitations to eating healthy. In the pre-test and post-test results, 100% (n=12), were interested in learning about nutrition, and felt that it could help them make better food selections. In the pre-test, 83.3% (n=10) participants stated they had a limitation to eating healthy, while 17% (n=2) strongly disagreed or disagreed that they had limitations to eating healthy. In the post-test 75% (n=9) felt they had a limitation to eating healthy, while 25% (n=3) stated they didn’t have limitations to eating healthy. For this question, it was a positive change if less participants selected that they had limitations to eating healthy. There was no significant difference between the pre-test and post-test results regarding attitude toward nutrition.

Table 4. Change in Attitudes (Intervention) N=12

	N (%)	N (%)	
Question	**Pre-Test**	**Post-Test**	**Change**
Eating healthy foods are important to my health	100.0	100.0	NC[1]
Having a healthy diet is important to me	100.0	100.0	NC
Eating healthy foods can lower my risk of developing chronic diseases	100.0	100.0	NC
Eating more fruits in my diet will make me healthier	100.0	100.0	NC
Eating more vegetables in my diet will make me healthier	100.0	100.0	NC
Eating more whole grains in my diet will make me healthier	100.0	100.0	NC
Lowering my sodium consumption is good for my health my diet will make me healthier	100.0	100.0	NC
Lowering my sugar consumption is good for my health	100.0	100.0	NC
Learning about nutrition can help me make better food selections	100.0	100.0	NC
I am interested in learning about nutrition	100.0	100.0	NC
I have limitations to being able to eat healthy	83.3	75.0	+[2]

NC[1] is no change in attitude; +[2] is an increase in those participants who strongly agreed or agreed with the statement

Baseline or Post-test Group Attitude

Baseline and post-test participants were asked the same attitude questions as the intervention group. Statistical frequency analysis measured percent of attitude change between the baseline group and the post-test group. In the baseline group, 100% (n=22) agreed or strongly agreed that a healthy diet, more whole grains and vegetables, and less sugar consumption was good for their health (Table 5). Similarly, 100% (n=15) in the post-test group strongly agreed or agreed with these statements as well.

In the baseline group, 95% (n=20) agreed and 5% (n=1) strongly disagreed that eating more fruits would make them healthier. For the question "lowering my sodium consumption is good for my health", 95% (n=20) agreed and 5% (n=1) disagreed in the baseline group, while 100% (n=15) in the post-test group agreed. For assessment of participants' interest in learning about nutrition, 86% (n=18) in the baseline were interested and 14% (n=3) were not interested, while 93% (n=14) in the post-test were interested and 7% (n=1) was not interested. In the

baseline group, 91% (n=19) agreed and 9% (n=2) disagreed that learning about nutrition was good for their health, compared to 100% (n=15) in the post-test group. When asked about the participants' limitations to eating healthy, 33% (n=7) agreed and 67% (n=14) disagreed that they had limitations to eating healthy in the baseline group. In the post-test group, 57% (n=8) agreed and 43% (n=6) disagreed that they had limitations to eating healthy. There was no significant difference between the baseline and post-test group regarding attitude.

Table 5. Change in Attitudes (Baseline vs. Post-test) N=37

	N (%)	N (%)	
Question	**Baseline**	**Post-Test**	**Change**
Eating healthy foods are important to my health	100.0	100.0	NC[1]
Having a healthy diet is important to me	100.0	100.0	NC
Eating healthy foods can lower my risk of developing chronic diseases	100.0	100.0	NC
Eating more fruits in my diet will make me healthier	95.0	100.0	+[2]
Eating more vegetables in my diet will make me healthier	100.0	100.0	NC
Eating more whole grains in my diet will make me healthier	100.0	100.0	NC
Lowering my sodium consumption is good for my health my diet will make me healthier	95.0	100.0	+
Lowering my sugar consumption is good for my health	100.0	100.0	NC
Learning about nutrition can help me make better food selections	91.0	100.0	+
I am interested in learning about nutrition	86.0	93.0	+
I have limitations to being able to eat healthy	33.0	57.0	-[3]

NC[1] is no change in attitude; +[2] is an increase in those participants who strongly agreed or agreed with the statement; -[3] is a decrease in those participants who strongly agreed or agreed with the statement;

RQ#3: Behavior Assessment

The final research question aimed to determine a change in the intent to change dietary behaviors after the education intervention. Participants were asked to describe their statement of readiness towards eating low sodium and low sugar foods, eating 2-3 servings of fruit and vegetables daily, and eating non-fat and whole grain products daily. Responses were collapsed into two groups, those partaking in the action and those not partaking in the action, to analyze results. Those participants partaking in the specific behavior were those who answered, "I

sometimes do", "I usually do", and "I always do". Those that responded, "I don't do", "I think about it but do not do", and "I feel ready to start" were those considered not partaking in the specific behavior. Results were measured based on the percentage of participants participating in the specific behavior (response options 4-6), and analyzed using statistical frequencies. Analysis was completed by comparing the pre-and-post test results of the intervention group, and comparing the baseline with the post-test group.

Intervention Group Behavior

Participants were asked to state their readiness of change on specific dietary behaviors. No change was found in behavior modification between the pre-test and post-test for the intervention group for the question "I eat low sodium foods", with 83.3% (n=10) doing this before and after the education intervention (Table 6). For the pre-test and post-test behavior of eating low sugar foods, 75% (n=9) participants did this behavior before and after the education intervention. For the question regarding "I eat 2-3 servings of vegetables every day", 66.7% (n=8) in the pre-test did this behavior, while 83.3% (n=10) stated they were now doing this in the post-test. In the pre-test, 66.7% (n=8) ate non-fat dairy products daily, with 83.3% (n=10) eating non-fat dairy products daily after the intervention. No significant difference was found between the pre-test and post-test.

Table 6. Change in Behavior (Intervention) N=12	N (%)	N (%)	
Behavior	**Pre-Test**	**Post-Test**	**Change**
I eat low sodium foods*	83.0	83.3	NC[1]
I eat foods that are low in sugar*	75.0	75.0	NC
I eat 2-3 servings of fruit every day*	66.7	50.0	-[2]
I eat 2-3 servings of vegetables every day*	66.7	83.3	+[3]
I eat non-fat dairy products every day*	66.7	83.3	+
I eat whole grain bread and cereal products daily*	97.1	83.3	-

**Statement of Readiness options 1 = I don't do and I don't think about it, 2 = I think about it but do not do, 3 = I feel ready to start, 4 = I sometimes do this, 5 = I usually do this, 6 = I do this all the time; +[3] is an increase in those participants who were partaking in the specific behavior; -[2] is a decrease in those participants who were partaking in the specific behavior; NC[1] is no change*

Baseline or Post-test Behavior

Statistical frequency and two-tailed t-test was used to analyze intent to change behavior of the baseline group compared to the post-test group. In response to "I eat low sodium foods", 55% (n=11) in the baseline group stated they were doing this behavior, compared to 79% (n=11) in the post-test group (Table 7). In the baseline group, 65% (n=13) stated they were eating foods low in sugar, while 93% (n=13) in the post-test group were eating foods low in sugar. Pertaining to the question "I eat whole grain bread and cereal products daily", 70% (n=15) stated they did in the baseline group, and 73% (n=11) stated they were doing this behavior in the post-test group. No significant difference was found in the intent to change behavior between the baseline and post-test group.

Table 7. Change in Behavior (Baseline vs. Post-test) N=37

	N (%)	N (%)	
Behavior	**Baseline**	**Post-Test**	**Change**
I eat low sodium foods*	55.0	73.0	+[1]
I eat foods that are low in sugar*	65.0	93.0	+
I eat 2-3 servings of fruit every day*	65.0	53.0	-[2]
I eat 2-3 servings of vegetables every day*	75.0	53.0	-
I eat non-fat dairy products every day*	60.0	53.0	-
I eat whole grain bread and cereal products daily*	70.0	73.0	+

**Statement of Readiness options 1 = I don't do and I don't think about it, 2 = I think about it but do not do, 3 = I feel ready to start, 4 = I sometimes do this, 5 = I usually do this, 6 = I do this all the time; +[1] is an increase in those participants who were partaking in the specific behavior; -[2] is a decrease in those participants who were partaking in the specific behavior;*

Daily Evaluation Assessment

In addition to the nutrition survey, participants completed a daily evaluation following each nutrition lesson (N=62). Descriptive statistics and two-tailed t-tests were used to analyze each post-lesson evaluation. Analysis was completed by comparing the questions that stated "before" the education session compared to the corresponding question of "after" the education session. Each evaluation asked questions either regarding the participants' knowledge, specific skill level, or behavior as it related to that day's lesson. Evaluation questions were ranked from "no skill" to "high" for skill levels, "never" to "always" for behavior questions, and "disagree" to "strongly agree" for knowledge based questions. For data analysis, answers were collapsed into two categories, low and high.

Great Grains

Participants were asked "I can identify an ounce portion of most grain foods I eat", and 31.3% (n=10) stated they were able to before the education session, and 69.2% (n=18) were able to after (p=0.01) (Table 8). Before the program, 36.7% (n=11) could identify 2 more health benefits of whole grains, while 81.5% (n=22) could identify health benefits after the program (p=0.04).

In the next set of questions, participants were asked about dietary behaviors from the past month, and to predict their dietary behaviors in the next month. In the question pertaining to eating three ounces or more of whole grains, 46.9% (n=15) stated they have in the past month, and 78.4% (n=25) stated they would in the next month (p=0.005). program, 37.5% (n=12) had read the label, while 71.9% (n=23) stated they plan to read the label (p=0.006).

Table 8. Familiarity & Use of Grains (N=32)

		N (%)	N (%)	
	Category	**No/Little Never/ Sometimes[1]**	**Moderate/ High Usually/ Always[2]**	**p-value**
Identify portion of grains-Before	Knowledge	68.8	31.3	
Identify portion of grains-After	Knowledge	30.8	69.2	0.01
Identify health benefits-Before	Knowledge	63.3	36.7	
Identify health benefits-After	Knowledge	18.5	81.5	0.04
Eat 3 or more ounces of whole grains- Past month	Behavior	53.1	46.9	
Eat 3 or more ounces of whole grains-Next month	Behavior	21.9	78.4	0.005
Read the fiber content on labels-Past month	Behavior	62.5	37.5	
Read the fiber content on labels- Next month	Behavior	9	23	0.006

No/Little, Never/Sometimes[1] is the participants who had no or little skill regarding knowledge based questions, and participants who never or sometimes participated in the dietary behavior; Moderate/High, Usually/Always[2] is participants who had moderate or high skill regarding knowledge based questions, and participants who usually or always participated in the dietary behavior

Senior Snacks

For the second education session evaluation, participants were asked about their snacking dietary behaviors in the past month, and to predict their dietary behavior in the next month. In the past month, 26.7% (n=8) planned their snacks based on Myplate, and 43.3% (n=13) planned to use Myplate in the next month (p=0.03) (Table 9). When asked "I've chosen my snack foods from fruits, vegetables, and whole grains", 48.3% (n=14) had in the past month, with 60% (n=18) planning to select these foods in the next month (p=0.004). Before the education session,

31% (n=9) tried a recipe containing a good source of fiber, and 57.1% (n=16) planned to use a recipe with a good source of fiber in the next month (p=0.001).

Table 9. Senior Behavior Regarding Snack Planning (N=30)

	N (%) Never/ Sometimes	N (%) Usually/ Always	p-value
Planned snacks from MyPlate-Past month	73.3	26.7	0.03
Plan snacks from MyPlate-Next month	56.7	43.3	
Chosen fruits, vegetables, whole grains-Past month	51.7	48.3	0.004
Chose fruits, vegetables, whole grains-Next month	40.0	60.0	
Tried recipes with fiber-Past month	69.0	31.0	0.001
Try recipes with fiber-Next month	42.9	57.1	

Heart Healthy Meals

For the heart healthy evaluation, participants were asked to select whether they were already making heart healthy food selections, or had plans to make changes in their food choices as a result of the education session. For question one, "plans menus based on MyPlate", 57.1% (n=12) stated they had a plan to do this within the month, and 19% (n=4) stated they had no plan to do this (Table 10). Regarding storing refrigerated food for no more than 3 days, and then throwing it out, 40% (n=8) said they would plan to do this, and 15% (n=3) had no plan. Participants were asked if they would "stock up on heart healthy staples such as fruits and vegetable; 42.1% (n=9) said they planned to within the month, and 4.8% (n=1) had no plans. When asked if participants planned to use a newer low-fat cooking method, 42.1% (n=8) said they would, while 5.3% (n=1) had no plan to do this. After the education session, 72.2% (n=13) planned to try a new heart healthy recipe, and 11.1% (n=2) stated they had no plans to try a new recipe. Participants were asked if they planned "to eat 2 or more cups of fruits and 2.5 cups of vegetables a day"; 52.4% (n=11) said they planned on making this change, while 9.5% (n=2) had no plan.

Table 10. Percent Behavior Change for Heart Healthy Session (N=21)

	N (%) No Plan[1]	N (%) Plan[2]
Plan menus based on MyPlate	19.0	57.1
Store food safely	15.0	40.0
Stock up on heart healthy food staples	4.8	42.9
Plan to use a new lower-fat cooking method	5.3	42.1
Try a new heart healthy recipe	11.1	72.2
Eat 2 or more cups of fruits & 2.5 cups of vegetables	9.5	52.4

No Plan[1] is participants who had no plans to change their dietary behavior; Plan[2] is participants who planned to change their dietary behavior

Cooking and Seasoning with Herbs

Evaluation of the herbs education lesson focused on the participants' confidence in applying food skills before the education session and after. For questions one and two, participants were asked how familiar they were with different types of herbs used to season their food. Before the program, 57.7% (n=15) felt they were familiar, compared with after the program where 80.8% (n=21) felt they were familiar with specific herbs (Table 11). No significance was determined, but there was an increase in percent of participants that felt more knowledgeable after the education session. The second set of questions were regarding use of herbs while cooking to decrease salt intake; 42.3% (n=11) stated they did this before the education session, while 69.2% (n=18) planned on doing this as result of the education session (p=0.004).

Table 11. Familiarity and Use of Herbs (N=26)

		N (%)	N (%)	
	Category	**D/N[1]**	**SA/A[2]**	**p-value**
Familiar with types of herbs- Before	Knowledge	42.3	57.7	NS[3]
Familiar with types of herbs- After	Knowledge	19.2	80.8	
Used herbs in cooking- Before	Behavior	57.7	42.3	0.004
Will use herbs in cooking- After	Behavior	30.8	69.2	

D/N[1] is participants who disagreed or were neutral; SA/A[2] is participants who strongly agreed or agree; NS[3] is no significant difference

Dietary Supplements

Participants were asked if they could "identify percent Daily Value on dietary supplement labels". Before the education session, 46.4% (n=13) could identify the percent daily value, and after 77.8% (n=21) (p=0.007) (Table 12). When asked about identifying safety concerns as it related to dietary supplements, 53.6% (n=15) before and 75% (n=21) could identify one or more safety concerns (p=0.01). As a result of the education session, 75% (n=21) felt they could identify one or more credible sources of information for dietary supplements, while 64.3% (n=18) felt they could identify the sources beforehand (p=0.001).

Table 12. Knowledge of Dietary Supplements (N=28)

	N (%)	N (%)	
	No/Little[1]	**Moderate/ High[2]**	**p-value**
Identify % Daily Value- Before	53.6	46.4	
Identify % Daily Value- After	22.2	77.8	0.007
Identify safety issues- Before	46.4	53.6	
Identify safety issues- After	25.0	75.0	0.01
Identify credible source of info- Before	35.7	64.3	
Identify credible source of info- After	25.0	75.0	0.001

No/Little[1] participants who reported having no or little skill level; Moderate/High[2] participants who reported having moderate to high skill level

Dietary Fat

For the final evaluation, participants were asked about any changes in their dietary choices as a result of the education session. In question one, 82.8% (n=24) felt confident to identify two or more health concerns with a high fat diet before the session, and 93.1% (n=27) felt confident after (p=0.001) (Table 13). When asked "I could identify two or more foods high in saturated or trans-fat", 79.3% (n= 23) felt they could beforehand, and 89.7% (n=26) felt they could after (p=0.03). In the past month, 51.7% (n=15) had decreased the amount of high

saturated and trans fats in their diet, and 69% (n=20) planned on doing this in the next month (p=0.03). Before the education session, 58.6% (n=17) stated they had increased healthy fats in their diets, while 65.5% (n=19) planned on doing this in the next month (p=0.02).

Table 13. Dietary Fat: Knowledge, Attitudes, & Behavior (N=29)

		N (%)	N (%)	
	Category	**SD/ D[4]**	**SA/ A[5]**	**p-value**
Identify 2 or more foods high in fat- Before	K[1]	20.7	79.3	
Identify 2 or more foods high in fat- After	K	10.3	89.7	0.03
Confidence in identifying 2 or more health concerns -Before	A[2]	17.2	82.8	
Confidence in identifying 2 or more health concerns - After	A	6.9	93.1	0.001
Decreased amount of sat/trans-fat-Past	B[3]	48.3	51.7	
Decrease amount of sat/trans-fat- Next	B	31.0	69.0	0.03
Increased healthy fats in diet- Past	B	41.4	58.6	
Will increase healthy fats in diet- Next	B	34.5	65.5	0.02

K[1] is knowledge; A[2] is attitude; B[3] is behavior; SD/D[4] is participants who strongly disagreed or disagreed with the statement; SA/A[5] is participants who strongly agreed or agreed with the statement

Summary

Data analysis from the intervention group (N=12) showed a significant increase in nutrition knowledge as result of the education intervention. However, no significant improvement was found in attitude or intent to change behavior for the intervention group. Participants in all study groups did agree that nutrition was important for their health, and that learning about nutrition could help them make nutritious choices. Comparison of the baseline and post-test group did indicate a positive change in knowledge, but no significant difference was found. Based on daily evaluations, participants seemed willing to change dietary habits as a result of the *Seniors Eating Well Curriculum*; however, based on results after the six-week intervention, this curriculum was not associated with significant dietary behavior changed in older individuals.

CHAPTER FIVE

DISCUSSION

The purpose of this quantitative study was to evaluate the impact of a nutrition education intervention program on the knowledge, attitudes, and intent to change behavior for those who were ≥ 60 years and were currently managing, or at risk for developing chronic diseases. This chapter assesses each of the three research questions and compares these findings with previous research as mentioned in the literature review.

Subjects

Gender identities for study participants were nearly split, with 49% identifying as male, 49% identifying as female, and 2% not providing feedback on this demographic variable. As it related to the presence of a chronic disease, 63% reported being diagnosed with at least one chronic disease. Those individuals who stayed for the completion of the study from the post-test group had the following characteristics: 53.5% identified as male, 40% identified as female, and 73.3% stated they had been diagnosed with at least one chronic disease. This is compared to the baseline where 45.5% identified as male, 54.5% identified as female, and 54.5% reported being diagnosed with at least one chronic disease. This contrasted with the study of Wallace, Lo, and Devine (2016), where the majority of study participants were female (70%), and at least 66.6% stated they had a non-communicable disease.

Due to suspected influential variables in the context of the environment for this study, recruitment of study participants was a challenge. The total intervention ended with 12 total participants who completed both the pre-and-post-test surveys. There was a total of 22 participants who completed the pre-test, but they did not complete the post-test at the end of the study. In contrast, there were 15 participants who chose not to complete the pre-test, but completed the post-test at the conclusion of the study. Regardless of incentive, participants were not willing to partake in the entirety of the education program. Recruitment for this population is challenging as observed in a study by MacFarlane et al. (2015). This study recruited adults 65 and older from an inpatient setting to partake in a 12-week multidisciplinary home-based nutrition and physical activity study. They screened 124 participants, and 88 were found ineligible to participate, 32 declined participation, and only 4 gave consent, and there was no significance observed in refusal or ineligibility as it related to socioeconomic or non-clinical characteristics. Suspected factors attributed to difficulty in recruitment and attainment of participants may be in relation to rural locations, older participants interest to participate, potential issues regarding health literacy, or difficulty in retaining education due to memory loss.

RQ#1: Knowledge Assessment

Intervention Group Knowledge

After completion of the six-week education intervention, there was a significant improvement as it related to nutrition knowledge in the intervention group comparing pre-test answers to post-test answers ($p=0.010$). There was an overall 75% increase in questions answered correctly on the post-test compared to those answered correctly on the pre-test. Similar results were found in a study completed by Wallace, Lo, and Devine (2016), where after a four-

week intervention they observed a 43% significant increase in knowledge scores for elderly individuals 61 years and older ($p<0.001$).

As it related to specific questions, no one in the pre-test answered correctly how many whole grains you should eat daily, and what type of fat should you not include in your diet. The majority of the public education topics may not cover, in-depth, either of these dietary behaviors, leading to none of the participants from the intervention group being able to answer them correctly at the start of the intervention.

There were four questions in-which a negative change was seen, or where less people answered the question correctly after the intervention as compared to before. The questions related to: (1) what was a lean cut of meat; (2) knowing the maximum percent daily value for supplements; and, (3) the benefit of lowering salt intake to recommended levels. This could have been related to factors of learning barriers for older individuals such as attention span, confusion with the wording of the questions, hearing problems or lack of efficient time to extensively cover the material in the time span of 45 minutes. Factors affecting learning in older adults are lack of time to learn effectively (Beier and Ackerman, 2005), their overall health (Smith and Balthes, 1997), and potential hearing loss (Weinstein et al, 2017). The combination of these are likely to have caused an effect on older members being able to retain this information and answer correctly.

Baseline or Post-Test Group Knowledge

There was a significant difference observed in the answers pertaining to whole grain consumption between the baseline and post-test group ($p=0.015$). There was also a significant difference in those who answered correctly that fruit was a healthy snack in the post-test group compared to the baseline group ($p=0.047$). This could be attributed to this populations' current dietary behaviors of fruit and whole grain consumption. According to the Healthy Eating Index

of 2011-2012 (2016), adults at least 65 years and older are eating more whole fruits and whole grains than those younger than them. No significant difference was observed for overall change in knowledge; however, there was a 79% increase in questions answered correctly from the baseline group to the post-test group.

Although sample size presented itself as a barrier to viewing the potential larger significance of this study, potential positive effects of nutrition education at the individual level was observed. In representation of this, a greater number of questions were answered correctly in the post-test group who completed the study compared to the baseline group.

RQ#2: Attitude Assessment

Intervention Group Attitude

To determine change in attitude, individuals were provided a series of questions and asked to rank their responses using the following options: Strongly Agree, Agree, Disagree, and Strongly Disagree. In the intervention group, all participants except one responded as 100% strongly agreed or agreed that nutrition was important for their health, that eating more nutritious foods would make them healthier, and that learning about nutrition was important to them. These results of positive attitude are comparable to one such study in which participants reported that a "good" diet was important for their health and was the key to a long, productive life (Brownie and Coutts, 2013).

The only question that saw a percent change, was regarding "I have limitations to eating healthy". Before the intervention, 83.3% of the participants in the intervention group felt they had limitations compared to 75% in the post-test, post intervention. No significance was observed in regard to limitations on healthy eating. This decrease in percent could potentially be from the individuals feeling before that they did not have the tools or knowledge to eat healthier,

and after the intervention felt that they had a better skill set to carry out eating healthier. In a study conducted by Brownie and Coutts (2013), they found that individuals 60 years or older had reported the cost of foods items, such as fruits and vegetables, was a barrier to making nutritious choices. Therefore, regardless of knowledge and attitudes, personal barriers may prevent dietary behavior changes in older adults.

Baseline or Post-Test Group Attitude

In six of the attitude questions, 100% of participants in the baseline and post-test group strongly agreed or agreed that eating healthy was important to their health, and that making specific dietary changes would make them healthier. This was comparable to Wallace, Lo, and Devine (2016), where 90% of the participants felt that eating healthy and cooking healthy was important to their health. In the baseline group, 86% of participants stated they were interested in learning about nutrition compared to 93% in the post-test group. Whitehead (2016), concluded that older adults who had a specific disease state found more motivation to eating healthier, and that those in the age group of less than 75 years were more in need of nutrition education. Therefore, it is possible that individuals who do not find nutrition important to their health, or felt that making healthful changes may not be important to their health may find that nutrition education is not warranted. Again, it is possible that the individuals who did not complete the study were not even interested in learning about nutrition at this time and did not have an interest in completing the study.

As it relates to limitations on eating healthy, 33% in the baseline group stated they had limitations compared to 57% in the post-test group. In a study conducted by Rothes, Lemos, and Goncalves (2017), they found that participants were likely to have greater engagement if they found the information relevant and important to them. Similar to the intervention group, perhaps

those in the post-test group felt it was important to partake in the study to gain more knowledge, and skills for choosing healthier options to increase their quality of life.

RQ#3: Behavior Assessment

Intervention Group Behavior

Intent to change behavior was measured based on the stages of change model. Participants were asked to report whether they were not thinking about doing the action, or if they were thinking about doing it, or if they felt ready to do it, or if they sometimes did it, or if they usually did it, or they always did it. Data was determined as a positive change if individuals had moved from the non-action phase to the action phase. Positive change was seen regarding two questions; "I eat 2-3 servings of vegetables every day" and "I eat non-fat dairy products every day". In a similar study, Brewer, Dickens, Humphrey, and Stephenson (2016) found a significant increase in actual fruit and vegetable intake after nutrition education. A push towards older individuals eating more fruits and vegetables, or non-fat dairy products could be the determination for change in behavior.

Baseline or Post-Test Group Behavior

Positive behavior change from baseline to the post-test group was seen regarding participants eating lower sodium food, lower sugar foods, and whole grain bread or cereal products. In the baseline group, 55% reported eating lower sodium foods, while 73% in the post-test group reported eating low sodium foods. Responses for lower sugar foods, 65% reported doing this dietary behavior compared to 93% in the post-test group. For dietary behavior involving eating more whole grain products, 70% in the baseline group reported doing this, while 73% in the post-test group reported eating whole grain products. Moreover, whole grain product consumption was coupled with a positive change in knowledge regarding the amount of whole

grains older adults should consume daily. Wallace, Lo, and Devine found that participants in their study who cooked and socialized within the education sessions were likely to increase their variety of spices, and choose to use less sodium foods (2016)**.** In the lesson plans for cooking and seasoning with herbs, participants got to taste test Italian herb seasoning on vegetables as a lower-sodium substitution while cooking. Perhaps the socialization of this activity, and taste testing of herbs provided a positive experience, and hence, more participants were willing to decrease sodium foods as it relates to this specific dietary behavior. Providing ample engaging activities in education programs may provide a bigger impact for behavior change in older adults. Unfortunately, time was a limitation here, so only one activity was generally provided for each lesson plan. Increased time for more activities might have indicated a change in the other dietary behavior categories as well.

A person's age is another potential contributor to change in behavior. One participant remarked in session that "at 90 years old it [changing my diet] won't make a difference". In a study conducted by Bardach, Schoenberg, and Howell (2015), they looked at what factors motivated older adults to improve their diet and exercise habits. In one part of their study they found that normalizing outcomes of old age decreased participants' motivation in which they had one 76-year-old female who stated, "part of it is just getting old" in regards to her overweight status.

Daily Evaluation Assessment

For each daily evaluation assessment, almost every question, except for one, showed a significant difference from before the start of that day's lesson to the end. However, a one-day lesson plan cannot be used as a true measure of intention of behavior change. In a study conducted by Walker, Kim, Hunt, Erickson, and Strimbu (2012), participants returned to

nutrition education sessions once every six months for three years before changes were observed in participants' BMI, blood glucose, diastolic pressure, and LDL. This study concluded that it took years to physically measure true dietary behavior change as it related to each participant's lab results. Therefore, these self-reports of behavior change from the daily evaluations do not accurately reflect true behavior change as a result the six-week intervention. Having a follow-up at six-months would have provided greater insight into the true effects of the education sessions.

Summary

A six-week nutrition education intervention for older adults did show an overall increase in knowledge; however, significance was observed only in the intervention group. While individuals already had exceptional attitudes regarding nutrition, this coupled with knowledge did not indicate significant change in intent to change behavior. However, in relation to specific categories of nutrition behavior, there were positive increases in the intention to change specific dietary behaviors. While participation was limited, the impact of the nutrition education shows that positive effects are possible, and that older adults are still interested in learning about how to eat healthier, and obtain a more healthful lifestyle.

CHAPTER 6

CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

The purpose of this quantitative study was to evaluate the impact of a nutrition education intervention program on the knowledge, attitudes, and intent to change behavior for those who were ≥ 60 years and were currently managing, or at risk for developing chronic diseases. This chapter summarizes the overall results of the study, limitations that occurred, and provides direction for potential opportunities for future studies.

Conclusions

After the six-week nutrition education intervention, an increase in knowledge scores was observed for both the intervention group, and the post-test group. In the intervention group, there was a significant increase in the number of questions that were answered correctly at the end of the six-weeks of education, as compared to the pre-test analysis ($p=0.010$). No significant difference was found between the baseline group and the post-test group. Had the sample-size been larger, it is hypothesized that a significant difference could have been observed.

There was no significant difference of change in attitude or intent to change behavior for either the intervention group, or the baseline and post-test group. Overall, most participants had agreed that eating healthier was important for their health, and that they were interested in learning about nutrition. This was common for all three groups. Regarding intent to change behavior, in the intervention group, participants indicated an intent to change behavior in eating

2-3 servings of vegetables, and non-fat dairy products every day. From the baseline to the post-test group, an intent to change behavior was identified in the amount of sodium, sugar, and whole grain products they ate daily.

Seniors Eating Well Curriculum is an excellent education tool for providing nutrition education for the elderly population. It is specifically structured to provide education in a fun, and hands-on environment to get participation from all members. It provided games, activities, and taste-testing to further grasp the nutrition education that was being taught. It meets the essential needs that many older adults utilize when learning a new concept.

Strengths

One of the strengths of this study is that the *Seniors Eating Well Curriculum* has been validated and used consistently as an education tool for elderly adults for the last 10 years. The program uses the Social Cognitive Theory to engage older adults in education, and they responded well to this type of tool. Secondly, all education sessions were done by the primary investigator, so each site was provided the same type of education in the same format. Lastly, this curriculum was recently updated to meet all the 2020 USDA Dietary Guidelines for older adults, so all information provided was accurate.

Limitations

Within this study, there was a wide variety of challenges and limitations as it related to data collection. First, the education sessions were completed during the members lunch hours, which were assigned to the PI as the time for the activities. Each site was different in time of day, and how many people showed up daily. Due to some of the participants' interest in other surrounding on-going activities, such as card games during lunch hour, it was distracting to some

of the members, and therefore, not everyone was willing to participate in the intervention. The distraction took away from the education session as others chatted around them. At one of the centers, they had activities such as BINGO after lunch which started immediately following the 45-minute education session. At times, this took precedence for the members and they were not willing to stay around to complete the surveys. At one of the centers where the participants came only to eat, there was greater consistency, and more participation seen. The PI also attempted to validate the Nutrition Survey, but due to lack of participants willing to take the nutrition survey twice, this was not possible.

Two of the centers required the members to drive to the location. This could have been a potential barrier for some members if they did not have constant reliable weekly transportation. This made it difficult to guarantee that the same participants would return weekly. Additionally, in the geographical region under study, many sites have received some type of nutritional education within the last five years from Ball State University's Undergraduate nutrition students. Therefore, there was only availability of three locations who had not received a lot of prior education, and the PI made the decision to not to conduct this study using a control group. A final consideration to note was the study duration allowing for observations of behavior changes to be made. In more specific context, the short-duration of the six-week study provided it to be difficult to draw conclusions regarding the lasting effects of behavior change. Due to lack of participation during the six-weeks, it was not applicable for the PI to return for a six-month follow-up.

Future Recommendations

For potential research in the future, the following recommendations are provided:

1. Recreate this study with a much larger sample size to measure the effects the curriculum has on participants' knowledge, attitudes, and behavior.
2. The education sessions should take place during a time where participants are distraction free, and no other activities are available during that time.
3. The survey should be validated and to ensure accurate testing of the questions provided.
4. A follow-up survey should be completed six months out to capture and measure longitudinal change in knowledge, attitudes, and behaviors.

Summary

Notable outcomes of this study involved positive changes in regard to the knowledge, attitudes, and intentions to change behavior of study participants. Based upon the observed impact of the intervention within the target population, nutrition education interventions in the senior population have promise regarding their efficacy. Despite limitations in definitively drawing conclusions regarding the direct relationship between nutrition education and dietary behavior changes, future considerations and insight were gained from working with this population of senior adults in the future. Drawing from this insight, future research may benefit from narrowing its focus on the improvement and tailoring of survey tools, selection of educational center sites, overall methodology for improving data outcomes, and determine underlying motivation within the older adult population. Therefore, the value that curriculums such as this bring by providing positive behavior change, demonstrate the potential value of similar interventions in enhancing the health and quality of life of older adults.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD MATERIALS

CITI CERTIFICATE OF COMPLETION

Appendix A-1 IRB Approval Letter

Office of Research Integrity
Institutional Review Board (IRB)
2000 University Avenue
Muncie, IN 47306-0155
Phone: 765-285-5070

DATE:	February 1, 2017
TO:	Nicole Driver
FROM:	Ball State University IRB
RE:	IRB protocol # 984152-2
TITLE:	A nutrition education intervention on the nutrition knowledge, attitudes, and intent to change behavior of senior citizens who attend LifeStream Services, Inc. centers
SUBMISSION TYPE:	Amendment/Modification
ACTION:	APPROVED
DECISION DATE:	February 1, 2017
REVIEW TYPE:	**EXEMPT**

The Institutional Review Board reviewed your protocol on February 1, 2017 and has determined the procedures you have proposed are appropriate for exemption under the federal regulations. As such, there will be no further review of your protocol, and you are cleared to proceed with the procedures outlined in your protocol. As an exempt study, there is no requirement for continuing review. Your protocol will remain on file with the IRB as a matter of record.

Exempt Categories:

	Category 1: Research conducted in established or commonly accepted educational settings, involving normal educations practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
	Category 2: Research involving the use of educational test (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior
	Category 3: Research involving the use of educational test (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under category 2, if: (i) the human subjects are elected or appointed officials or candidates for public office; or (ii) Federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
	Category 4: Research involving the collection of study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or

	if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.
	Category 5: Research and demonstration projects which are conducted by or subject to the approval of Department or agency heads, and which are designed to study, evaluate or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in methods or levels of payment for benefits or services under these programs.
	Category 6: Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed which contains a food ingredient at or below the level and for a use found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

Editorial Notes:

1. Modification Approved

While your project does not require continuing review, it is the responsibility of the P.I. (and, if applicable, faculty supervisor) to inform the IRB if the procedures presented in this protocol are to be modified or if problems related to human research participants arise in connection with this project. **Any procedural modifications must be evaluated by the IRB before being implemented, as some modifications may change the review status of this project.** Please contact (ORI Staff) if you are unsure whether your proposed modification requires review or have any questions. Proposed modifications should be addressed in writing and submitted electronically to the IRB (http://www.bsu.edu/irb) for review. Please reference the above IRB protocol number in any communication to the IRB regarding this project.

Reminder: Even though your study is exempt from the relevant federal regulations of the Common Rule (45 CFR 46, subpart A), you and your research team are not exempt from ethical research practices and should therefore employ all protections for your participants and their data which are appropriate to your project.

Bryan Byers, PhD/Chair
Institutional Review Board

Christopher Mangelli, JD, MS, MEd, CIP/Director
Office of Research Integrity

Appendix A-2 -CITI Certificate of Completion

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- Name: Nicole Driver (ID: 5812948)
- Email: nmdriver@bsu.edu
- Institution Affiliation: Ball State University (ID: 1568)
- Institution Unit: Nutrition and Health Science

- Curriculum Group: Social & Behavioral Research - Basic/Refresher
- Course Learner Group: Same as Curriculum Group
- Stage: Stage 1 - Basic Course
- Description: Choose this group to satisfy CITI training requirements for investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- Report ID: 20840657
- Completion Date: 23-Sep-2016
- Expiration Date: 23-Sep-2019
- Minimum Passing: 80
- Reported Score*: 83

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction (ID: 1127)	12-Sep-2016	3/3 (100%)
Students in Research (ID: 1321)	12-Sep-2016	4/5 (80%)
History and Ethical Principles - SBE (ID: 490)	13-Sep-2016	4/5 (80%)
Defining Research with Human Subjects - SBE (ID: 491)	13-Sep-2016	5/5 (100%)
The Federal Regulations - SBE (ID: 502)	13-Sep-2016	4/5 (80%)
Assessing Risk - SBE (ID: 503)	13-Sep-2016	4/5 (80%)
Informed Consent - SBE (ID: 504)	13-Sep-2016	4/5 (80%)
Privacy and Confidentiality - SBE (ID: 505)	14-Sep-2016	4/5 (80%)
Research with Prisoners - SBE (ID: 506)	14-Sep-2016	4/5 (80%)
Research with Children - SBE (ID: 507)	14-Sep-2016	4/5 (80%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	14-Sep-2016	5/5 (100%)
International Research - SBE (ID: 509)	14-Sep-2016	4/5 (80%)
Internet-Based Research - SBE (ID: 510)	14-Sep-2016	4/5 (80%)
Research and HIPAA Privacy Protections (ID: 14)	23-Sep-2016	5/5 (100%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	23-Sep-2016	3/4 (75%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	23-Sep-2016	3/5 (60%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	23-Sep-2016	4/5 (80%)
Ball State University (ID: 13475)	23-Sep-2016	No Quiz

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- Name: Nicole Driver (ID: 5812948)
- Email: ndriver@bsu.edu
- Institution Affiliation: Ball State University (ID: 1568)
- Institution Unit: Nutrition and Health Science

- Curriculum Group: Social & Behavioral Research - Basic/Refresher
- Course Learner Group: Same as Curriculum Group
- Stage: Stage 1 - Basic Course
- Description: Choose this group to satisfy CITI training requirements for investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- Report ID: 20840657
- Report Date: 23-Sep-2016
- Current Score**: 83

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Students in Research (ID: 1321)	12-Sep-2016	4/5 (80%)
Ball State University (ID: 13475)	23-Sep-2016	No Quiz
History and Ethical Principles - SBE (ID: 490)	13-Sep-2016	4/5 (80%)
Defining Research with Human Subjects - SBE (ID: 491)	13-Sep-2016	5/5 (100%)
Belmont Report and CITI Course Introduction (ID: 1127)	12-Sep-2016	3/3 (100%)
The Federal Regulations - SBE (ID: 502)	13-Sep-2016	4/5 (80%)
Assessing Risk - SBE (ID: 503)	13-Sep-2016	4/5 (80%)
Informed Consent - SBE (ID: 504)	13-Sep-2016	4/5 (80%)
Privacy and Confidentiality - SBE (ID: 505)	14-Sep-2016	4/5 (80%)
Research with Prisoners - SBE (ID: 506)	14-Sep-2016	4/5 (80%)
Research with Children - SBE (ID: 507)	14-Sep-2016	4/5 (80%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	14-Sep-2016	5/5 (100%)
International Research - SBE (ID: 509)	14-Sep-2016	4/5 (80%)
Internet-Based Research - SBE (ID: 510)	14-Sep-2016	4/5 (80%)
Research and HIPAA Privacy Protections (ID: 14)	23-Sep-2016	5/5 (100%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	23-Sep-2016	3/4 (75%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	23-Sep-2016	4/5 (80%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	23-Sep-2016	3/5 (60%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORKREQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Monica Mansfield (ID: 5926334)
- **Institution Affiliation:** Independent Learner (ID: 569)
- **Phone:** 7658103533

- **Curriculum Group:** Human Subjects Research - BASIC
- **Course Learner Group:** Human Subjects Research – Social-Behavioral-Educational Basic
- **Stage:** Stage 1 - Independent Learner

- **Report ID:** 21251342
- **Completion Date:** 23-Oct-2016
- **Expiration Date:** 23-Oct-2017
- **Minimum Passing:** 80
- **Reported Score*:** 89

REQUIRED AND ELECTIVE MODULE ONLY	DATE COMPLETED	SCORE
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	23-Oct-2016	5/5 (100%)
Belmont Report and CITI Course Introduction (ID: 1127)	23-Oct-2016	3/3 (100%)
Cultural Competence in Research (ID: 15166)	23-Oct-2016	5/5 (100%)
History and Ethical Principles - SBE (ID: 490)	23-Oct-2016	4/5 (80%)
Defining Research with Human Subjects - SBE (ID: 491)	23-Oct-2016	4/5 (80%)
The Federal Regulations - SBE (ID: 502)	23-Oct-2016	5/5 (100%)
Assessing Risk - SBE (ID: 503)	23-Oct-2016	4/5 (80%)
Informed Consent - SBE (ID: 504)	23-Oct-2016	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	23-Oct-2016	4/5 (80%)
Research with Prisoners - SBE (ID: 506)	23-Oct-2016	4/5 (80%)
Research with Children - SBE (ID: 507)	23-Oct-2016	4/5 (80%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	23-Oct-2016	4/5 (80%)
International Research - SBE (ID: 509)	23-Oct-2016	5/5 (100%)
Internet-Based Research - SBE (ID: 510)	23-Oct-2016	5/5 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	23-Oct-2016	4/5 (80%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

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- **Course Learner Group:** Human Subjects Research – Social-Behavioral-Educational Basic
- **Stage:** Stage 1 - Independent Learner

- **Report ID:** 21251342
- **Report Date:** 23-Oct-2016
- **Current Score**:** 89

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
History and Ethical Principles - SBE (ID: 490)	23-Oct-2016	4/5 (80%)
Defining Research with Human Subjects - SBE (ID: 491)	23-Oct-2016	4/5 (80%)
Belmont Report and CITI Course Introduction (ID: 1127)	23-Oct-2016	3/3 (100%)
The Federal Regulations - SBE (ID: 502)	23-Oct-2016	5/5 (100%)
Assessing Risk - SBE (ID: 503)	23-Oct-2016	4/5 (80%)
Informed Consent - SBE (ID: 504)	23-Oct-2016	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	23-Oct-2016	4/5 (80%)
Research with Prisoners - SBE (ID: 506)	23-Oct-2016	4/5 (80%)
Research with Children - SBE (ID: 507)	23-Oct-2016	4/5 (80%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	23-Oct-2016	4/5 (80%)
International Research - SBE (ID: 509)	23-Oct-2016	5/5 (100%)
Internet-Based Research - SBE (ID: 510)	23-Oct-2016	5/5 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	23-Oct-2016	4/5 (80%)
Cultural Competence in Research (ID: 15166)	23-Oct-2016	5/5 (100%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	23-Oct-2016	5/5 (100%)

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COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Kylie Mennel (ID: 6034643)
- **Email:** krmennel@bsu.edu
- **Institution Affiliation:** Ball State University (ID: 1568)
- **Institution Unit:** Dietetics

- **Curriculum Group:** Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Report ID:** 21861346
- **Completion Date:** 09-Jan-2017
- **Expiration Date:** 09-Jan-2020
- **Minimum Passing:** 80
- **Reported Score*:** 99

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction (ID: 1127)	07-Jan-2017	3/3 (100%)
Students in Research (ID: 1321)	07-Jan-2017	5/5 (100%)
History and Ethical Principles - SBE (ID: 490)	07-Jan-2017	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	08-Jan-2017	5/5 (100%)
The Federal Regulations - SBE (ID: 502)	08-Jan-2017	5/5 (100%)
Assessing Risk - SBE (ID: 503)	08-Jan-2017	5/5 (100%)
Informed Consent - SBE (ID: 504)	08-Jan-2017	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	08-Jan-2017	5/5 (100%)
Research with Prisoners - SBE (ID: 506)	08-Jan-2017	5/5 (100%)
Research with Children - SBE (ID: 507)	08-Jan-2017	5/5 (100%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	08-Jan-2017	5/5 (100%)
International Research - SBE (ID: 509)	08-Jan-2017	5/5 (100%)
Internet-Based Research - SBE (ID: 510)	09-Jan-2017	5/5 (100%)
Research and HIPAA Privacy Protections (ID: 14)	09-Jan-2017	5/5 (100%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	09-Jan-2017	4/4 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	09-Jan-2017	5/5 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	09-Jan-2017	4/5 (80%)
Ball State University (ID: 13475)	09-Jan-2017	No Quiz

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COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Kylie Mennel (ID: 6034643)
- **Email:** krmennel@bsu.edu
- **Institution Affiliation:** Ball State University (ID: 1568)
- **Institution Unit:** Dietetics

- **Curriculum Group:** Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Report ID:** 21861346
- **Report Date:** 13-Jan-2017
- **Current Score**:** 99

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Introduction (ID: 757)	09-Jan-2017	No Quiz
Students in Research (ID: 1321)	07-Jan-2017	5/5 (100%)
Ball State University (ID: 13475)	09-Jan-2017	No Quiz
History and Ethical Principles - SBE (ID: 490)	07-Jan-2017	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	08-Jan-2017	5/5 (100%)
Belmont Report and CITI Course Introduction (ID: 1127)	07-Jan-2017	3/3 (100%)
The Federal Regulations - SBE (ID: 502)	08-Jan-2017	5/5 (100%)
Assessing Risk - SBE (ID: 503)	08-Jan-2017	5/5 (100%)
Informed Consent - SBE (ID: 504)	08-Jan-2017	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	08-Jan-2017	5/5 (100%)
Research with Prisoners - SBE (ID: 506)	08-Jan-2017	5/5 (100%)
Research with Children - SBE (ID: 507)	08-Jan-2017	5/5 (100%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	08-Jan-2017	5/5 (100%)
International Research - SBE (ID: 509)	08-Jan-2017	5/5 (100%)
Human Subjects Research at the VA (ID: 13)	09-Jan-2017	3/3 (100%)
Internet-Based Research - SBE (ID: 510)	09-Jan-2017	5/5 (100%)
The IRB Member Module - 'What Every New IRB Member Needs to Know' (ID: 816)	09-Jan-2017	7/7 (100%)
Research and HIPAA Privacy Protections (ID: 14)	09-Jan-2017	5/5 (100%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	09-Jan-2017	4/4 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	09-Jan-2017	4/5 (80%)
Hot Topics (ID: 487)	09-Jan-2017	No Quiz
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	09-Jan-2017	5/5 (100%)

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COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** McKenzie Evans (ID: 6076297)
- **Institution Affiliation:** Ball State University (ID: 1568)
- **Institution Email:** mpevans@bsu.edu
- **Institution Unit:** Dietetics

- **Curriculum Group:** Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Record ID:** 22006229
- **Completion Date:** 21-Jan-2017
- **Expiration Date:** 21-Jan-2020
- **Minimum Passing:** 80
- **Reported Score*:** 91

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction (ID: 1127)	21-Jan-2017	3/3 (100%)
Students in Research (ID: 1321)	21-Jan-2017	5/5 (100%)
History and Ethical Principles - SBE (ID: 490)	21-Jan-2017	4/5 (80%)
Defining Research with Human Subjects - SBE (ID: 491)	21-Jan-2017	5/5 (100%)
The Federal Regulations - SBE (ID: 502)	21-Jan-2017	5/5 (100%)
Assessing Risk - SBE (ID: 503)	21-Jan-2017	4/5 (80%)
Informed Consent - SBE (ID: 504)	21-Jan-2017	4/5 (80%)
Privacy and Confidentiality - SBE (ID: 505)	21-Jan-2017	5/5 (100%)
Research with Prisoners - SBE (ID: 506)	21-Jan-2017	5/5 (100%)
Research with Children - SBE (ID: 507)	21-Jan-2017	3/5 (60%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	21-Jan-2017	5/5 (100%)
International Research - SBE (ID: 509)	21-Jan-2017	5/5 (100%)
Internet-Based Research - SBE (ID: 510)	21-Jan-2017	5/5 (100%)
Research and HIPAA Privacy Protections (ID: 14)	21-Jan-2017	4/5 (80%)
Vulnerable Subjects - Research involving Workers/Employees (ID: 483)	21-Jan-2017	4/4 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	21-Jan-2017	4/5 (80%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	21-Jan-2017	5/5 (100%)
Ball State University (ID: 13475)	21-Jan-2017	No Quiz

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COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** McKenzie Evans (ID: 6876297)
- **Institution Affiliation:** Ball State University (ID: 1568)
- **Institution Email:** mpevans@bsu.edu
- **Institution Unit:** Dietetics

- **Curriculum Group:** Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Record ID:** 22006229
- **Report Date:** 21-Jan-2017
- **Current Score**:** 90

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Students in Research (ID: 1321)	21-Jan-2017	5/5 (100%)
Ball State University (ID: 13475)	21-Jan-2017	No Quiz
History and Ethical Principles - SBE (ID: 490)	21-Jan-2017	4/5 (80%)
Defining Research with Human Subjects - SBE (ID: 491)	21-Jan-2017	5/5 (100%)
Belmont Report and CITI Course Introduction (ID: 1127)	21-Jan-2017	3/3 (100%)
The Federal Regulations - SBE (ID: 502)	21-Jan-2017	5/5 (100%)
Assessing Risk - SBE (ID: 503)	21-Jan-2017	4/5 (80%)
Informed Consent - SBE (ID: 504)	21-Jan-2017	4/5 (80%)
Privacy and Confidentiality - SBE (ID: 505)	21-Jan-2017	5/5 (100%)
Research with Prisoners - SBE (ID: 506)	21-Jan-2017	5/5 (100%)
Research with Children - SBE (ID: 507)	21-Jan-2017	2/5 (40%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	21-Jan-2017	5/5 (100%)
International Research - SBE (ID: 509)	21-Jan-2017	5/5 (100%)
Internet-Based Research - SBE (ID: 510)	21-Jan-2017	5/5 (100%)
Research and HIPAA Privacy Protections (ID: 14)	21-Jan-2017	4/5 (80%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	21-Jan-2017	4/4 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	21-Jan-2017	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	21-Jan-2017	4/5 (80%)
I Have Agreed to be an IRB Community Member. Now What? (ID: 13018)	21-Jan-2017	Quiz Not Taken

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COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Megan Pate (ID: 6032053)
- **Email:** mnpate@bsu.edu
- **Institution Affiliation:** Ball State University (ID: 1568)
- **Institution Unit:** Dietetics
- **Phone:** (317)340-1241

- **Curriculum Group:** Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Report ID:** 21839438
- **Completion Date:** 19-Jan-2017
- **Expiration Date:** 19-Jan-2020
- **Minimum Passing:** 80
- **Reported Score*:** 95

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction (ID: 1127)	19-Jan-2017	3/3 (100%)
Students in Research (ID: 1321)	19-Jan-2017	4/5 (80%)
History and Ethical Principles - SBE (ID: 490)	19-Jan-2017	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	19-Jan-2017	5/5 (100%)
The Federal Regulations - SBE (ID: 502)	19-Jan-2017	4/5 (80%)
Assessing Risk - SBE (ID: 503)	19-Jan-2017	4/5 (80%)
Informed Consent - SBE (ID: 504)	19-Jan-2017	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	19-Jan-2017	5/5 (100%)
Research with Prisoners - SBE (ID: 506)	19-Jan-2017	5/5 (100%)
Research with Children - SBE (ID: 507)	19-Jan-2017	4/5 (80%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	19-Jan-2017	5/5 (100%)
International Research - SBE (ID: 509)	19-Jan-2017	5/5 (100%)
Internet-Based Research - SBE (ID: 510)	19-Jan-2017	5/5 (100%)
Research and HIPAA Privacy Protections (ID: 14)	19-Jan-2017	5/5 (100%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	19-Jan-2017	4/4 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	19-Jan-2017	5/5 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	19-Jan-2017	5/5 (100%)
Ball State University (ID: 13475)	19-Jan-2017	No Quiz

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- **Name:** Megan Pate (ID: 6032053)
- **Email:** mnpate@bsu.edu
- **Institution Affiliation:** Ball State University (ID: 1568)
- **Institution Unit:** Dietetics
- **Phone:** (317)340-1241

- **Curriculum Group:** Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Report ID:** 21839438
- **Report Date:** 19-Jan-2017
- **Current Score**:** 95

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Students in Research (ID: 1321)	19-Jan-2017	4/5 (80%)
Ball State University (ID: 13475)	19-Jan-2017	No Quiz
History and Ethical Principles - SBE (ID: 490)	19-Jan-2017	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	19-Jan-2017	5/5 (100%)
Belmont Report and CITI Course Introduction (ID: 1127)	19-Jan-2017	3/3 (100%)
The Federal Regulations - SBE (ID: 502)	19-Jan-2017	4/5 (80%)
Assessing Risk - SBE (ID: 503)	19-Jan-2017	4/5 (80%)
Informed Consent - SBE (ID: 504)	19-Jan-2017	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	19-Jan-2017	5/5 (100%)
Research with Prisoners - SBE (ID: 506)	19-Jan-2017	5/5 (100%)
Research with Children - SBE (ID: 507)	19-Jan-2017	4/5 (80%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	19-Jan-2017	5/5 (100%)
International Research - SBE (ID: 509)	19-Jan-2017	5/5 (100%)
Internet-Based Research - SBE (ID: 510)	19-Jan-2017	5/5 (100%)
Research and HIPAA Privacy Protections (ID: 14)	19-Jan-2017	5/5 (100%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	19-Jan-2017	4/4 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	19-Jan-2017	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	19-Jan-2017	5/5 (100%)

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CITI PROGRAM

Completion Date 06-Jan-2017
Expiration Date N/A
Record ID 21836851

This is to certify that:

Sarahd Doerffler

Has completed the following CITI Program course:

RCR FOR SOCIAL, BEHAVIORAL & EDUCATIONAL RESEARCHERS (Curriculum Group)
RCR FOR SOCIAL, BEHAVIORAL & EDUCATIONAL RESEARCHERS (Course Learner Group)
1 - RCR (Stage)

Under requirements set by:

Ball State University

CITI

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APPENDIX B

LETTER OF SUPPORT

Appendix- B – Letter of Support

LifeStream
Life. On your terms.

December 5, 2016

Dear Ball State University,

LifeStream Services was invited by Nicole Driver, a Ball State University graduate student, to potentially be a study site for her project on nutrition education for the dietary management of chronic diseases. Our café site participants would benefit from the lessons on nutrition along with the promotion of healthier eating. Nicole Driver has permission to present and collect data for her research study pending the approval of the Institutional Review Board for Human Subjects at Ball State University.

If you should need additional information, please feel free to contact Julie Hale at 765-759-1121 or jhale@lifestreaminc.org.

Thank you,

[redacted]

Kenneth D. Adkins
President/CEO

LifeStream Services, Inc. | 1701 Pilgrim Boulevard | Post Office Box 308 | Yorktown, IN 47396-0308
Phone: 765.759.1121 | Toll Free: 800.589.1121 | TTY: 866.801.6606 | Fax: 765.759.0060
E-mail: mail@lifestreaminc.org | www.lifestreaminc.org

APPENDIX C

NUTRITION SURVEY

POST-LESSON EVALUATIONS

Appendix C-1-Nutrition Survey

Nutrition Survey

ID#_____

Please do **NOT** put your name on this portion of the survey.

Your answers are Anonymous. Thank you!

Nutrition Survey

Please **check** the correct answer(s) for each of the following questions.

1. How many ounces of whole grain should you eat daily?

   - 2 ounces
   - 3 ounces
   - 1 ounce
   - 4 ounces
   - I am unsure

2. Which is the best whole grain option?

   - White rice
   - Wheat pasta
   - Rice Krispies
   - Triscuits
   - I am unsure

3. Which two are the best sources of fiber?

   - Potatoes and carrots
   - Oatmeal and peas
   - Puffed cereal and bananas
   - Pasta and meatballs
   - I am unsure

4. How often should you eat a snack during the day?

- Every 1-2 hours
- Every 2-3hours
- Every 4-5 hours
- Every 6-7 hours
- I am unsure

5. A good snack includes which selections:

- Fruits
- Refined grains
- Vegetable
- Deli lunch meat
- I am unsure

6. Please circle which foods are grocery staples for a heart healthy meal.

Low-fat yogurt Fish fillets Avocados

Potatoes Apple Juice I am unsure

7. Which is a lean cut of meat?

- Ribeye Steak
- Pork Ribs
- Skinless chicken breast
- Sausage
- I am unsure

8. Please circle each option that is a lower-fat cooking method.

Poaching Frying Steaming

Baking I am unsure

9. Which is a recommended supplement for those over the age of 60?

- Vitamin C
- Calcium
- Vitamin E
- Potassium
- I am unsure

10. Who/what should you consult before taking a supplement?

- The Internet
- A physician
- Health Newsletters
- A family member
- I am unsure

11. What is the maximum percent daily value of supplements that you should consume daily?

- 75%
- 80%
- 100%
- Depends on the individual
- I am unsure

12. Please circle each food that is a good source of unsaturated fat.

Avocado Fish Coconut oil Flank Steak I am unsure

13. Which type of fat should you **NOT** include in your diet?

- Polyunsaturated Fat
- Saturated Fat
- Trans Fat
- Monounsaturated fat
- I am unsure

14. Which is **NOT** a fat-soluble vitamin?

- Vitamin E
- Vitamin C
- Vitamin A
- Vitamin K
- I am unsure

15. Please circle which options below are considered an herb?

Garlic Thyme Cilantro Salt I am unsure

16. What is a benefit of lowering your salt intake to recommended levels?

- It can keep your blood pressure low
- It can keep your blood sugar low
- It can help control your weight
- It can help control your cholesterol level
- I am unsure

17. Please circle the response in which best represents your beliefs for the following statements. (SA=Strongly agree, A=Agree, D=Disagree, SD=Strongly Disagree)	**SA**	**A**	**D**	**SD**
17a. Eating healthy foods are important to my health.	SA	A	D	SD
17b. Having a healthy diet is important to me.	SA	A	D	SD
17c. Eating healthy foods can lower my risk of developing chronic diseases. (diabetes, heart disease, hypertension, stroke, etc.)	SA	A	D	SD

18. Please circle the response in which best represents your beliefs for the following statements. (SA=Strongly agree, A=Agree, D=Disagree, SD=Strongly Disagree)	**SA**	**A**	**D**	**SD**
18a. Eating more fruits in my diet will make me healthier.	SA	A	D	SD
18b. Eating more vegetables will make me healthier.	SA	A	D	SD
18c. Eating more whole grains will make me healthier.	SA	A	D	SD
18d. Lowering my sodium consumption will be good for my health.	SA	A	D	SD
18e. Lowering my sugar consumption will be good for my health.	SA	A	D	SD

19. Please circle the response in which best represents your beliefs for the following statements. (SA=Strongly agree, A=Agree, D=Disagree, SD=Strongly Disagree)	**SA**	**A**	**D**	**SD**
19a. Learning about nutrition can help me make better food selections.	SA	A	D	SD
19b. I am interested in learning about nutrition.	SA	A	D	SD
19c. I have limitations to being able to eat healthy.	SA	A	D	SD

20. Read each statement on the left. Check the box that best describes how you feel **TODAY**:

Statement of Readiness....	1. I DON'T do and I DON'T think about it	2. I THINK about it but do NOT do	3. I feel READY to start	4. I do this SOMETIMES	5. I USUALLY do this	6. I do this ALL the time
20a. I eat low sodium foods	☐	☐	☐	☐	☐	☐
20b. I eat foods that are low in sugar	☐	☐	☐	☐	☐	☐
20c. I eat **2-3** servings of **fruit** every day	☐	☐	☐	☐	☐	☐
20d. I eat **2-3** servings of **vegetables** every day	☐	☐	☐	☐	☐	☐
20e. I eat **nonfat dairy** products every day	☐	☐	☐	☐	☐	☐
20f. I eat **whole grain** bread and cereal products daily	☐	☐	☐	☐	☐	☐

21. Have you in the past year been diagnosed with at least one type of chronic disease? (Heart disease, diabetes, cancer, stroke, hypertension, etc.)

□ Yes □ No

22. How would you describe your weight?

_____Very Underweight _____Slightly Underweight

_____About the right weight _____Slightly Overweight

_____Very Overweight

Demographic Information: This information is being collected to assess representativeness of the sample.

1. Please select the range that includes your age?

□ Less than 60
□ 60-69
□ 70-79
□ 80-89
□ 90+

2. What is your gender? □ Female □ Male

Appendix C-2-Post Lesson Evaluation

Nutrition Survey

ID#_____

BALL STATE UNIVERSITY

ID#____

EVALUATION FOR GREAT GRAINS PROGRAM

Please circle your answer for each question indicating your level of confidence in applying the food skills **BEFORE** attending this program; and now, **AFTER** this program.

1. I can identify an ounce portion of most grain foods I eat.

Before today's program	NO SKILL	LITTLE	MODERATE	HIGH
After today's program	NO SKILL	LITTLE	MODERATE	HIGH

2. I can identify 2 or more health benefits of whole grains.

Before today's program	NO SKILL	LITTLE	MODERATE	HIGH
After today's program	NO SKILL	LITTLE	MODERATE	HIGH

As a result of today's program, please indicate if you have any plans to make the following changes in your food choices. Circle your choice.

3. In the *past* month, I ate 3 or more ounces of whole grains most days.	NEVER	SOMETIMES	USUALLY	ALWAYS
4. In the *next* month, I will eat 3 or more ounces of whole grains most days.	NEVER	SOMETIMES	USUALLY	ALWAYS
5. In the *past* month, I read the fiber content on grain food labels.	NEVER	SOMETIMES	USUALLY	ALWAYS
6. In the *next* month, I will read the fiber content on grain food labels.	NEVER	SOMETIMES	USUALLY	ALWAYS

Lesson 1

Nutrition Survey

ID#_____

ID#_____

EVALUATION FOR ALL STAR SENIOR SNACKS

Listed below are a set of food choices and skills that some people make and some people do not. As a result of today's program, please indicate if you have any plans to make the following changes in your food choices. Circle your choices.

1. In the PAST month, I planned my snacks based on MyPlate.

NEVER SOMETIMES USUALLY ALWAYS

2. In the NEXT month, I will plan my snacks based on MyPlate.

NEVER SOMETIMES USUALLY ALWAYS

3. In the PAST month, I've chosen my snack foods from fruits, vegetables, and whole grains.

NEVER SOMETIMES USUALLY ALWAYS

4. In the NEXT month, I plan to choose my snack foods from fruits, vegetables, and whole grains.

NEVER SOMETIMES USUALLY ALWAYS

5. In the PAST month, I've tried recipes containing a good source of fiber.

NEVER SOMETIMES USUALLY ALWAYS

6. In the NEXT month, I plan to try recipes containing a good source of fiber.

NEVER SOMETIMES USUALLY ALWAYS

Nutrition Survey

ID#_____

ID#__

BALL STATE UNIVERSITY.

EVALUATION FOR HEART HEALTHIER MEALS

Listed below are a set of food choices that some people make and some people do not. As a result of today's program, please indicate if you have any plans to make the following changes in your food choices. Circle your choice.

	I did this before the workshop	Plan to do within month	No plans
1. Plan menus based on MyPlate	BEFORE	PLAN	NO
2. Store food safely: use leftovers within 3 days, freeze, or throw out	BEFORE	PLAN	NO
3. Stock up on heart healthy staples such as fruits and vegetables	BEFORE	PLAN	NO
4. Plan to use a new lower-fat cooking method (stir-fry, steam, poach, crock-pot)	BEFORE	PLAN	NO
5. Try a new heart healthy recipe	BEFORE	PLAN	NO
6. Eat 2 or more cups of fruits and 2.5 cups of vegetables a day	BEFORE	PLAN	NO

Nutrition Survey

ID#_____

BALL STATE UNIVERSITY

EVALUATION FOR
COOKING AND SEASONING WITH HERBS PROGRAM

Please circle your answer for each question indicating your level of confidence in applying the food skills **BEFORE** attending this program; and now, **AFTER** this program.

1. BEFORE today's program, I was familiar with many types of herbs used to season foods.

DISAGREE NEUTRAL AGREE STRONGLY AGREE

2. AFTER today's program, I am more familiar with many types of herbs used to season foods.

DISAGREE NEUTRAL AGREE STRONGLY AGREE

3. BEFORE today's program, I used herbs in cooking or seasoning of food to help decrease my salt intake at home.

DISAGREE NEUTRAL AGREE STRONGLY AGREE

4. AFTER today's program, I plan to use herbs in cooking or seasoning of food to help decrease my salt intake at home.

DISAGREE NEUTRAL AGREE STRONGLY AGREE

Lesson 4

Nutrition Survey

ID#_____

BALL STATE UNIVERSITY.

EVALUATION FOR DIETARY SUPPLEMENTS FOR SENIORS

Listed below are a set of health and fitness choices that some people do or agree with, and some people do not. As a result of today's program, indicate any changes in your health and fitness choices. Circle your choices.

1. BEFORE today's program, I could identify % Daily Value on dietary supplement labels.

NO CONFIDENCE LITTLE MODERATE HIGH

2. AFTER today's program, I can identify % Daily Value on dietary supplement labels.

NO CONFIDENCE LITTLE MODERATE HIGH

3. BEFORE today's program, I could identify one or more safety issues with dietary supplements.

NO CONFIDENCE LITTLE MODERATE HIGH

4. AFTER today's program, I can identify one or more safety issues with dietary supplements.

NO CONFIDENCE LITTLE MODERATE HIGH

5. BEFORE today's program, I could identify one or more credible sources of information for dietary supplements.

NO CONFIDENCE LITTLE MODERATE HIGH

6. AFTER today's program, I can identify one or more credible sources of information for dietary supplements.

NO CONFIDENCE LITTLE MODERATE HIGH

Nutrition Survey

ID#_____

BALL STATE UNIVERSITY

EVALUATION FOR DIETERY FAT – FACT OR FICTION?

Listed below are a set of health choices that some people agree with and some do not. As a result of today's program, indicate any changes in your choices. Please circle your answers.

1. BEFORE today's program, I was confident in my ability to identify two or more health concerns with a higher fat diet.

STRONGLY DISAGREE | DISAGREE | AGREE | STRONGLY AGREE

2. AFTER today's program, I am confident in my ability to identify two or more health concerns with a higher fat diet.

STRONGLY DISAGREE | DISAGREE | AGREE | STRONGLY AGREE

3. BEFORE today's program, I could identify two or more foods high in saturated or trans fat.

STRONGLY DISAGREE | DISAGREE | AGREE | STRONGLY AGREE

4. AFTER today's program, I can identify two or more foods high in saturated or trans fat.

STRONGLY DISAGREE | DISAGREE | AGREE | STRONGLY AGREE

5. In the PAST month, I've decreased the amount of higher saturated or trans fats in my diet.

NEVER | SOMETIMES | USUALLY | ALWAYS

6. In the NEXT month, I plan to decrease the amount of higher saturated or trans fats in my diet.

NEVER | SOMETIMES | USUALLY | ALWAYS

7. In the PAST month, I have increased the amount of healthy fat foods in my diet.

NEVER | SOMETIMES | USUALLY | ALWAYS

8. In the NEXT month, I plan to increase the amount of healthy fat foods in my diet.

NEVER | SOMETIMES | USUALLY | ALWAYS

APPENDIX D

RECRUITMENT SCRIPT

Appendix D – Recruitment Script

Hello, my name is Nicole and I am a graduate student at Ball State University. I am here today to invite you all to participate in my study that I am conducting for my master's degree. My research is focused on the nutritional needs of people who are 60 years or older that may be at risk or currently managing chronic diseases such as heart disease, diabetes, or cancer. Those who participate will join me every week over a six-week period in learning about nutrition and how to make healthy nutrition selections. Each session will be 45-minutes and some will include activities such as a game. All lessons and activities will not require you to move from your seat. These sessions will be held here at the center before your meal time and will be once a week for six weeks. Those who participate will need to complete a consent form and there will be a pre- and post-test survey to fill out that will cover information about nutrition along with your personal experience with nutrition choices. To compensate you for your time, there will be a chance for three individuals to win a $20 Marsh gift card at the end of the study, which will be determined by a raffle drawing. For each lesson you attend, you will be given a raffle ticket. Thank you for your time and I hope you all will consider joining me in these fun and educational nutrition sessions. If you choose not to participate in my study you still may join in the lesson and games. I am happy to answer any questions you may have at this time.

APPENDIX E

SUBJECT CONSENT FORM

Appendix E- Subject Consent Form

Study Title A nutrition education intervention on dietary management of chronic diseases among the elderly in Delaware and Madison Counties Indiana

Study Purpose and Rationale
The purpose of this research project is to examine the impact of a nutrition education intervention program on the knowledge, attitude, and intent to change behavior of those at risk of developing chronic diseases. Findings from this research may be used by senior center directors to assist participants to live a more healthful lifestyle.

Inclusion/Exclusion Criteria
To be eligible to participate in this study, you must be at least 60 years or older and be able to read at the 6^{th} grade level.

Participation Procedures and Duration
For this project, you will be asked to complete a pre-test related to nutrition and your attitude toward nutrition. A weekly 45-minute nutrition education lesson will be provided. You will then be asked to complete a post-test survey at the end of study. The entirety of this program will take seven weeks.

Data Confidentiality or Anonymity
All data will be maintained as confidential and no identifying information such as names will appear in any publication or presentation of the data.

Storage of Data
Paper data will be stored in a Ball State faculty's locked office, and will be shredded after two years. The data will also be entered into a software program and stored on the researcher's password-protected computer for two years and then deleted. Only members of the research team will have access to the data.

Risks or Discomforts
The only anticipated risk of participating in this study is that you may feel uncomfortable answering a question. You may choose not to answer a question that makes you uncomfortable and are free to quit the study at any time.

Who to Contact Should You Experience Any Negative Effects this Study
Should you experience any feelings of anxiety, there are counseling services available to you through Still Waters Professional Counseling, LLC in Muncie, (765) 284-0043. You will be responsible for the costs of any care that is provided. It is understood that in the unlikely event that treatment is necessary as a result of your participation in this research project, Ball State University, its agents, and employees will assume whatever responsibility is required by law.

Benefits
One benefit you may gain from participating in this study is a better understanding of how to select nutritious foods that can benefit your overall health status.

Voluntary Participation
Your participation in this study is completely voluntary and you are free to withdraw your permission at any time for any reason without penalty or prejudice from the investigator. Please feel free to ask any questions of the investigator before signing this form and at any time during the study.

IRB Contact Information
For one's rights as a research subject, you may contact the following: For questions about your rights as a research subject, please contact the Director, Office of Research Integrity, Ball State University, Muncie, IN 47306, (765) 285-5070 or at irb@bsu.edu

Study Title A nutrition education intervention on dietary management of chronic diseases among the elderly in Delaware and Madison County Indiana

Consent

I, _____, agree to participate in this research project entitled, "A nutrition education intervention on dietary management of chronic diseases among the elderly in Delaware and Madison County Indiana." I have had the study explained to me and my questions have been answered to my satisfaction. I have read the description of this project and give my consent to participate. I understand that I will receive a copy of this informed consent form to keep for future reference.

To the best of my knowledge, I meet the inclusion/exclusion criteria for participation (described on the previous page) in this study.

_____ _____
Participant's Signature Date

Researcher Contact Information

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